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COMPUTERWORLD

INSIDE

Spotlight — Modems acquire new names and functions to keep pace with changes in data communications. Center pullout section.

In Depth — Brad Cox on object-oriented programming: Write new code, but keep the old. **Page 59**

Beta-test users rate the second release of Software AG's fourth-generation language, which is expected to be released today. Page 4.

As part of last week's rollouts, AT&T officials hint at a more powerful host system for the firm's 3B2 line. Page 6.

Unisys connects Sperry micros to the Burroughs micro network, rolls out two small mainframes and throws its hat into the 80386 ring. Page 9.

Customized integration services lead DEC's latest assault on the factory automation market. Page 12.

Gould inaugurates a new line of superminicomputers, clustering CPUs to achieve a 96 MIPS rating. Page 15.

Putting the finishing touches on Computer Inquiry III, the FCC decides to treat protocol conversion as an unregulated, enhanced service. Page 2.

Early LU6.2 application spans multivendor gap

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Spectrum Concepts, Inc. is expected to announce this week XCOM6.2, the first multivendor commercial turnkey software application that runs on IBM's LU6.2 peer-to-peer communications protocol.

Targeting companies that currently use IBM's Remote Job Entry and Network Job Entry protocols to handle intersystem file transfer, XCOM6.2 will reportedly provide users with the first off-the-shelf application for LU6.2, according to Keith Eisenstark, Spectrum Concepts' director of marketing. Many analysts were not expecting this for at least two years.

XCOM6.2 performs the same basic file-transfer functions as RJE but adds LU6.2's device independence, a greater range of communications protocol support and consistent programming interfaces, Spectrum claims. As a result, the firm says, users will have more flexibility in transferring files among a wide range of computers using whatever communications methods they choose.

The XCOM6.2 product family will run on top of existing LU6.2 hardware and software developed either by host or third-party vendors.

The initial introduction is set to include XCOM6.2 programs for Digital Equipment Corp. VAX/VMS systems as well as IBM System/38s, Personal Computers and mainframes running MVS. A programmer who has worked extensively on the project says Spectrum hopes to announce implementations of XCOM6.2 on the following systems by year's end or early in 1988: IBM DOS VSE, native VM and the System/36 in addi-

Continued on page 8

IBM readies 200-product PC tidal wave

BY ED SCANNELL
CW STAFF

MIAMI — "Here it comes."

Those are the words on the invitations sent to corporate users, software developers and dealers for what promises to be a tidal wave of systems, communications and software-related announcements from IBM here this week.

The products, which sources say number approximately 200, constitute an entire second generation of systems that will be the foundation of the company's corporate microcomputer strategy for the next several years.

Many major corporate accounts have been invited to the introduction along with 200 software developers, 20 of whom will demonstrate products that

Continued on page 101

Honeywell Bull born

French, Japanese firms formalize ownership

NEW YORK — Heralding "a unique combination," executives of the new computer systems group formed by Honeywell, Inc., Compagnie des Machines Bull and Japan's NEC Corp. last week unveiled plans for building on the flagging operations of Honeywell Information Systems in the U.S.

Named Honeywell Bull, Inc., the privately held company will be headquartered in Minneapolis; its executive management will be dominated by officials from France's Bull, which was once called Honeywell Bull and which will have five seats on the nine-man board of directors, including the chairman's position.

Jacques Stern, chairman and chief executive officer of Bull, was named chairman of Honeywell Bull, while former Honeywell Information Systems Executive Vice-President Jerome J. Meyer was named president and CEO and will fill one of Honeywell's two seats on the board of the venture; NEC will have one seat on the board.

Honeywell retained 42.5% ownership in the venture, which was first announced in December 1986, following negotiations first made public in September 1986. It sold 42.5% of its former holdings to Bull — although it has an option to sell more than half of its remaining stake to Bull at year-end 1988 — and an additional 15% to NEC, netting $527 million in cash, more than double the expected price Honeywell announced in December.

'Stronger supplier'

Honeywell Chairman Edson Spencer said the venture will provide information systems customers "with a stronger competitive supplier along with continuity and protection of their investment in computer systems."

"Honeywell Bull is a separate company and an American company with American management," Stern said. "But if you were to add together the sales of Honeywell Bull and NEC's computer businesss, they would amount to about $9 billion; that would rank No. 2 worldwide."

One user with a dozen Honeywell DPS6 mid-range systems said he was happy to see the restructuring completed. "Our first response is that we

Continued on page 102

CASHING IN

NCR marches to its own beat

BY CLINTON WILDER
CW STAFF

Like the ornate brass cash registers alongside the computers in its product display hall, NCR Corp. in many ways is a study in contrasts.

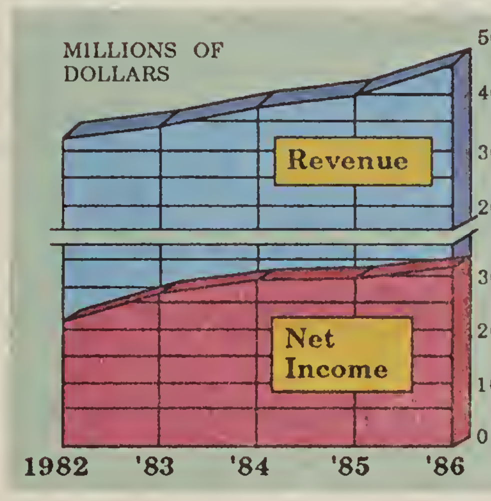
Headquartered in the unlikely high-tech enclave of Dayton, Ohio, it is one of the industry's most financially conservative companies — but has exciting technological developments in fields such as transaction processing and incremental computing. It is the industry's oldest company but also one of the few major systems suppliers with a highly successful merchant semiconductor business.

And at a time when every vendor from IBM on down is reorienting itself toward vertical markets and the "solution sell," NCR still believes that superior products, sold on their technological advantages, will win in the marketplace.

Continued on page 81

**NCR growth:
Modest but steady**

13% growth in 1986 marked NCR's first double-digit revenue increase since 1980



INFORMATION PROVIDED BY NCR CORP.
CW CHART: MITCHELL J. HAYES

NEWSPAPER

IN THIS ISSUE

Up with power. AT&T adds high-end Model 600 to 3B2 line and hints of future host machine, while the Unisys label will tag the V 510 and V 530 small mainframes, said to double and quadruple the power of former Burroughs machines. Pages 6, 9.

NEWS

4 IBM moves up 9370 Information System ship date by two months.

4 Beta-test users say performance improvements of Software AG's Natural 2 are vast.

8 Palladian ports Management Advisor package to Apollo workstations.

10 Varityper claims VT-600 is highest resolution laser printer available.

10 NCGA conference attendees want vendors to meet their needs.

10 Computervision rolls out the next generation of its CAD/CAM system.

12 DEC forges into factory systems market with integrations service, software, service offerings.

13 CDC breaks out of niche with first departmental system.

14 Plexus designs high-end processor to integrate diverse data, documents.

14 ADR seeks buyer for computer-based training system.

15 Gould claims speeds of 96 MIPS, 300 MFLOPS for high-end machines.

18 Gateways, satellites add spice to Interface '87 product parade.

19 Micom releases direct Unix, Ethernet connection for 80386.

101 3Com premiers first line of diskless workstations featuring built-in adapters, advanced graphics.

101 IBM strategy for control of PC market includes rash of product announcements.

102 Reagan's Cabinet seeks retaliation against Japan's chip dumping.

SOFTWARE & SERVICES

25 Success of All-In-1 helps DEC sell computers.

25 ADR/Vollie allows shared program development across IBM VM, VSE systems.

25 Multisoft development tool builds IBM peer-to-peer applications.

Easing transition trauma. Page 69.

MICROCOMPUTING

35 Borland develops Linguistic Technology for use on CD-ROM.

35 Inexpensive PC project-management package developed in India.

35 Hand-held text scanner provides alternative to rekeying data.

35 Summit Software's BetterBASIC judged best for compatibility.

NETWORKING

47 Interlink emulators support full-screen terminal access to IBM, DEC hosts.

47 Avatar's Alliance ZSL links PCs for around $100 each.

47 Token-Ring support, VME interface among expected Interface '87 announcements.

SYSTEMS & PERIPHERALS

53 Bank of Chicago aims toward centralization of its 10 operating environments.

53 Tape subsystem for use with DEC minis allows faster buffering.

Quotable

> *"The merger itself was a launching, not an arrival, and we operate under no illusions that safe passage is guaranteed."*
>
> W. MICHAEL BLUMENTHAL
> "UNISYS CORP. ANNUAL REPORT"

MANAGEMENT

69 Colonial Penn pegs information systems as strategic asset.

69 MIS research center leader questions use of leading-edge technology.

69 MIS managers find kid-glove techniques ease employee transition.

COMPUTER INDUSTRY

75 ADR struggles with weak market, IBM to remain No. 1 software alternative.

75 Rodime files yet another infringement suit.

75 Wang pens development agreements with Diebold and Sterling.

EMPLOYMENT TODAY

87 Organizations, agencies help employees bounce back from layoffs.

SPOTLIGHT

Modems demonstrate remarkable adaptability as telecommunications networks evolve. Follows page 52.

IN DEPTH

59 The malleable system: Object-oriented programming places change at the center of software development. By Brad Cox.

OPINION & ANALYSIS

21 Grayson suggests solutions to the expert system dilemma.

25 Fosdick unlocks convergence strategy with ISPF key.

35 Zachmann calls 10-Base hot property in relational DBMS market.

47 Carosella bills 9370 as IBM's anchor to LAN environment.

53 Connolly waves goodbye to the paper chase.

69 Synnott comments on the evolution of three types of systems.

75 Szuprowicz sees IBM moving rapidly toward AI.

DEPARTMENTS

20 Editorial

95 Buy Sell Swap

FCC keeps hands off protocol conversion

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Putting the finishing touches on its Computer Inquiry III proceeding, the Federal Communications Commission last week reached the difficult decision to continue treating protocol conversion as an unregulated, enhanced service.

That decision, supported by users groups, means that AT&T and the regional holding companies can offer protocol conversion services only if they meet the FCC's accounting and interconnection rules intended to prevent discrimination against competitors.

After disposing of the protocol processing issue and clarifying the FCC's rules for Comparably Efficient Interconnection and Open Network Architecture, FCC Chairman Mark S. Fowler declared that the commission's "road map" for a competitive telecommunications industry is in place.

"Provided we use our road map wisely, competitors of all stripes will soon be providing a range of communications-related services never before possible due to artificial constraints on our nation's largest telephone companies," Fowler said. Under previous rules, the dominant carriers were required to use separate subsidiaries to offer unregulated services.

Under the Computer Inquiry III regulatory scheme, basic network services are regulated, while enhanced services are exempt from traditional utility regulation. AT&T and the divested Bell companies can offer enhanced services without using a separate subsidiary if they meet the FCC's cost-allocation rules and provide other enhanced-service providers with equal access to their networks.

'Difficult to decide'

Fowler said the commission found it very difficult to decide whether to define protocol processing as a basic or enhanced service. AT&T and the divested Bell companies argued that it would be more efficient to embed protocol conversion in their basic network services.

"I can easily understand why many sincere industry representatives have found it desirable to end any federal rules limiting the role of protocol conversion in network design," Fowler said.

"However, by reaffirming the unregulated status of protocol processing, we are also keeping the faith with the large and competitive data communications industry. Regulation, federal or state, has no place in that competitive business," Fowler said.

The International Communications Association and the Ad Hoc Telecommunications Users Committee, two major users groups, had urged the FCC to define protocol processing as an unregulated, enhanced service.

Spectrum set to go

HP ships beta, sees on-time delivery of system

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week announced shipment of beta-test versions of its initial general-purpose Spectrum system and expressed confidence that the company will meet the rapidly approaching revised target date for commercial delivery.

During the coming weeks, HP said it plans to install 12 of its Series 930s for testing purposes in both U.S. and international accounts. Three of the shipments reportedly took place during the week of March 16 and went to domestic customer locations.

The timing of the Series 930 deliveries keeps HP basically on target with the beta-test timetable to which the firm publicly committed itself during a securities analysts' meeting in January. Last September, HP said deliveries would fall six months behind schedule.

Not everyone, though, finds the timing of the first Series 930 beta-test shipments altogether comforting. One user of HP's existing 3000-series systems last week voiced doubts about the apparent brevity of the vendor's beta-test period.

In an ideal situation, HP should begin beta tests of a major new product six months before the company officially releases it, according to the user, who asked to remain anonymous.

An HP spokesman characterized the length of the company's current testing schedule as adequate.

"We see no problems today in beginning limited-quantity shipments of the 930 sometime between May and August and deliveries of the Series 950 during the second half of 1987," the spokesman said.

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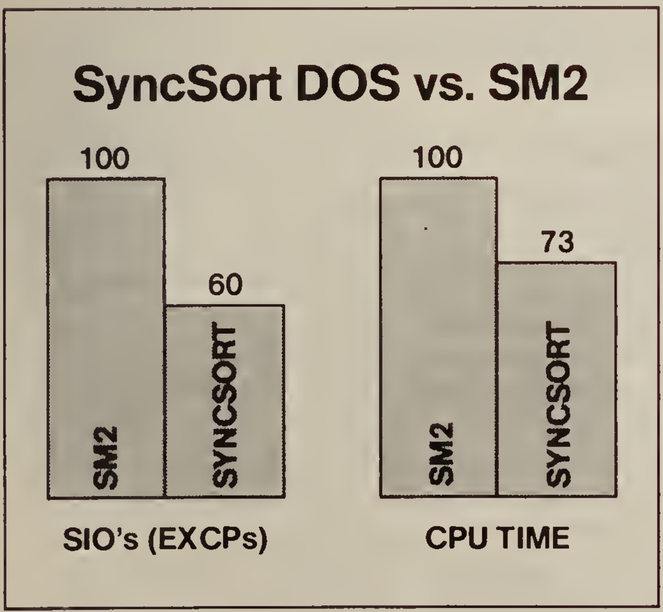

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IBM hastens 9370's arrival

High importance and large demand push delivery date up to July

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM last week moved up the delivery date of its 9370 Information System by two months, a step analysts said was expected because the system is both in great demand and critical to IBM's success in the mid-range market.

Fixed configuration versions of the 9370 Model 20 and Model 60 will be shipped in July instead of October, the vendor said. Customers participating in the IBM Early Support Program were scheduled to receive systems this month, while shipments of 9370 development systems to be used by authorized value-added resellers are slated to begin next month.

"The reason for this is obvious," said Marty Gruhn, vice-president of the Sierra Group, a market research firm. "They need revenue in 1987, and they need product on the street that can compete with Digital Equipment Corp. in a real sense. And it's a product in demand."

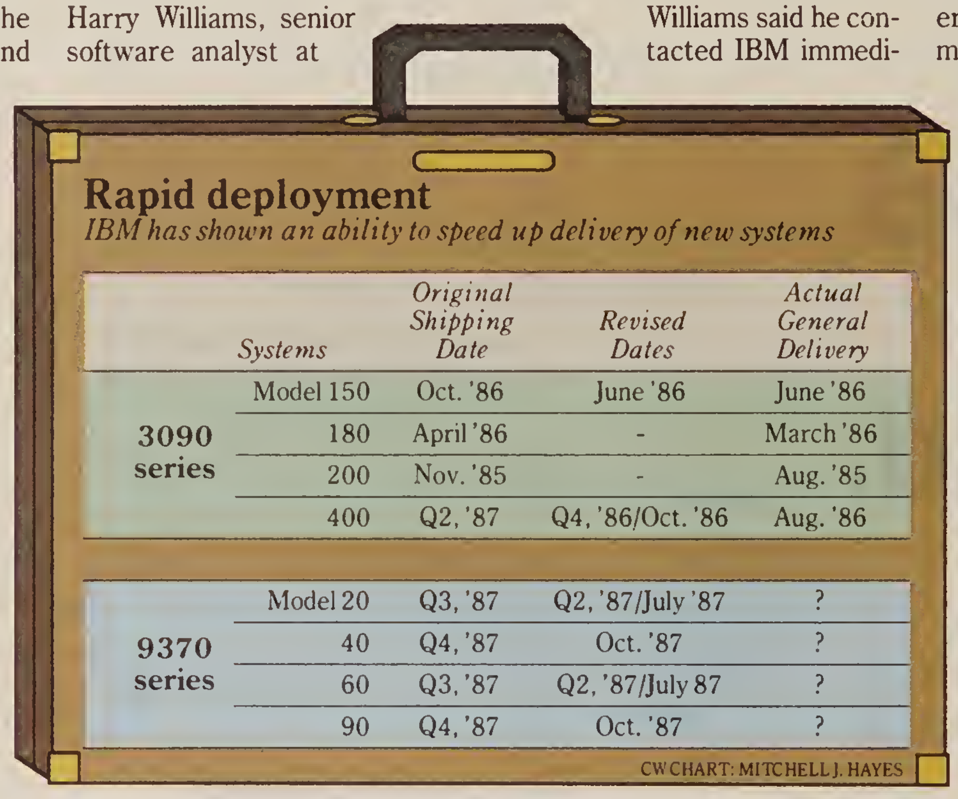
But apparently not every potential 9370 user will benefit from the new shipment date. Harry Williams, senior software analyst at Marist College in Poughkeepsie, N.Y., commented that he was thrilled when he heard about the early shipment dates last week, because he has been anxiously awaiting a 9370 he ordered last fall.

Williams said he contacted IBM immediately following last week's announcement, but a few days later, he was told to expect a delivery date of January 1988. "We're going to see what we can work with them," he said. The system is slated to serve as the host computer at the college's new science and communications center.

An IBM spokeswoman explained that the reason for offering fixed configuration systems initially is to help speed up delivery. "Obviously, if you have a more limited number, you can build them faster," she said. There will be 20 versions of the Model 20 and Model 60 available this summer, she added.

The earlier shipment dates "were expected by outsiders and IBM itself," said David Moschella, an International Data Corp. analyst. "The original dates were very conservative, and they certainly need to get out there and compete in that market."

According to the IBM spokeswoman, 9370 orders number in the "tens of thousands," and large accounts with multiple systems ordered make up two-thirds of that amount.



Rapid deployment
IBM has shown an ability to speed up delivery of new systems

	Systems	Original Shipping Date	Revised Dates	Actual General Delivery
3090 series	Model 150	Oct. '86	June '86	June '86
	180	April '86	-	March '86
	200	Nov. '85	-	Aug. '85
	400	Q2, '87	Q4, '86/Oct. '86	Aug. '86
9370 series	Model 20	Q3, '87	Q2, '87/July '87	?
	40	Q4, '87	Oct. '87	?
	60	Q3, '87	Q2, '87/July 87	?
	90	Q4, '87	Oct. '87	?

CW CHART: MITCHELL J. HAYES

Natural 2 does CPU windows

BY CHARLES BABCOCK
CW STAFF

RESTON, Va. — Beta-test users of Natural 2, the second version of Software AG of North America, Inc.'s fourth-generation language, which is due to be announced today, say it borrows the concept of windowing from personal computers and makes it available for mainframe applications.

In addition, other improvements to Natural 2, which now includes automatic array processing, are yielding large performance gains.

At one site, Inland Container Corp. in Indianapolis, Larry Lammers, the development language administrator, says he has been seeing performance gains of 70% to 80%.

'Comparable to Cobol'

"The speeds we have seen are not as fast as assembler but comparable to Cobol," Lammers says. The gain in speed and functionality in the new version is prompting Inland users to view Natural 2 as a new language rather than an enhanced version of the original, he adds.

The revamped language is slated to interface to IBM's DB2 by the end of this year, Software AG President Stuart Miller says. This move represents Software AG's recognition that its fourth-generation language will coexist with IBM's relational data base product as well as support Software AG's competing product, Adabas.

Natural was first introduced in 1978 and has an installed base of 2,400 licenses.

In addition to windowing, the four-year Natural redevelopment effort has yielded the following:

- Intelligent editors for data definition and follow-up stages of applications development.
- An ability to call subprograms in either Natural or third-generation languages that are external to the running program module and therefore usable by a variety of applications. Natural could previously only call subroutines within an application.
- A split-screen mapping facility that allows the display of data layouts from the Software AG Predict data dictionary. Selection of fields can be performed in check-off fashion for inclusion on a map without incurring the possibility of error when names must be typed onto screens.
- A structured mode of programming that enforces certain syntax constructs for production applications and allows for easier maintenance.

"You can create more PC-like applications. That's what the user community wants," Lammers says.

Another beta-test site, Washington State University in Pullman, Wash., is in the process of converting 6,000 Cobol programs into Natural 2. Its new functions will encourage the use of on-line systems for users, complete with Help screens that can be opened in the middle of an application, maintains Steve Watson, director of administrative computing services.

"It will change the way we do applications. There's more to the product than we thought there would be," he says.

> "WITH Natural 2, you can create more PC-like applications. That's what the user community wants."
>
> LARRY LAMMERS
> INLAND CONTAINER CORP.

Watson said Natural 2 will also change the type of programmer he seeks to hire. In the past, he has looked for people with four to five years of experience in Cobol. Now, he will look for "business application experience" on the grounds that applications are easier to build with Natural 2's editors and intelligent screen design facilities.

Natural 2 programs are showing a 60% performance improvement over their predecessor Natural 1.2 programs, Watson asserts.

One performance improvement was to send only the modified parts of screens to the mainframe from a terminal, reducing from 960 to a handful the number of characters sent down-line, Miller explains.

Natural 2 is scheduled to be available in May at a price of $25,000 to $150,000. It runs in IBM's CICS, IMS/DC and TSO teleprocessing environments as well as VM/CMS. The fourth-generation language works with Adabas or IBM VSAM and DL/1 files, with a DB2 interface scheduled for delivery by the end of this year.

Focus shifts to 4GL

Miller explains that Software AG has concentrated on developing its fourth-generation language because it wants Natural to be viewed as a strategic product on a par with a data base management system. Since Software AG also markets the aging Adabas system, the move reflects a shift of emphasis, if not resources, at the company toward Natural.

Adabas and other established hierarchical and networked data base management system sales are believed to be losing ground as IBM's DB2 and other relational products gain customers. D & B Computing Services, Inc. previously announced a windowing capability to its fourth-generation language but will not deliver it until next January.

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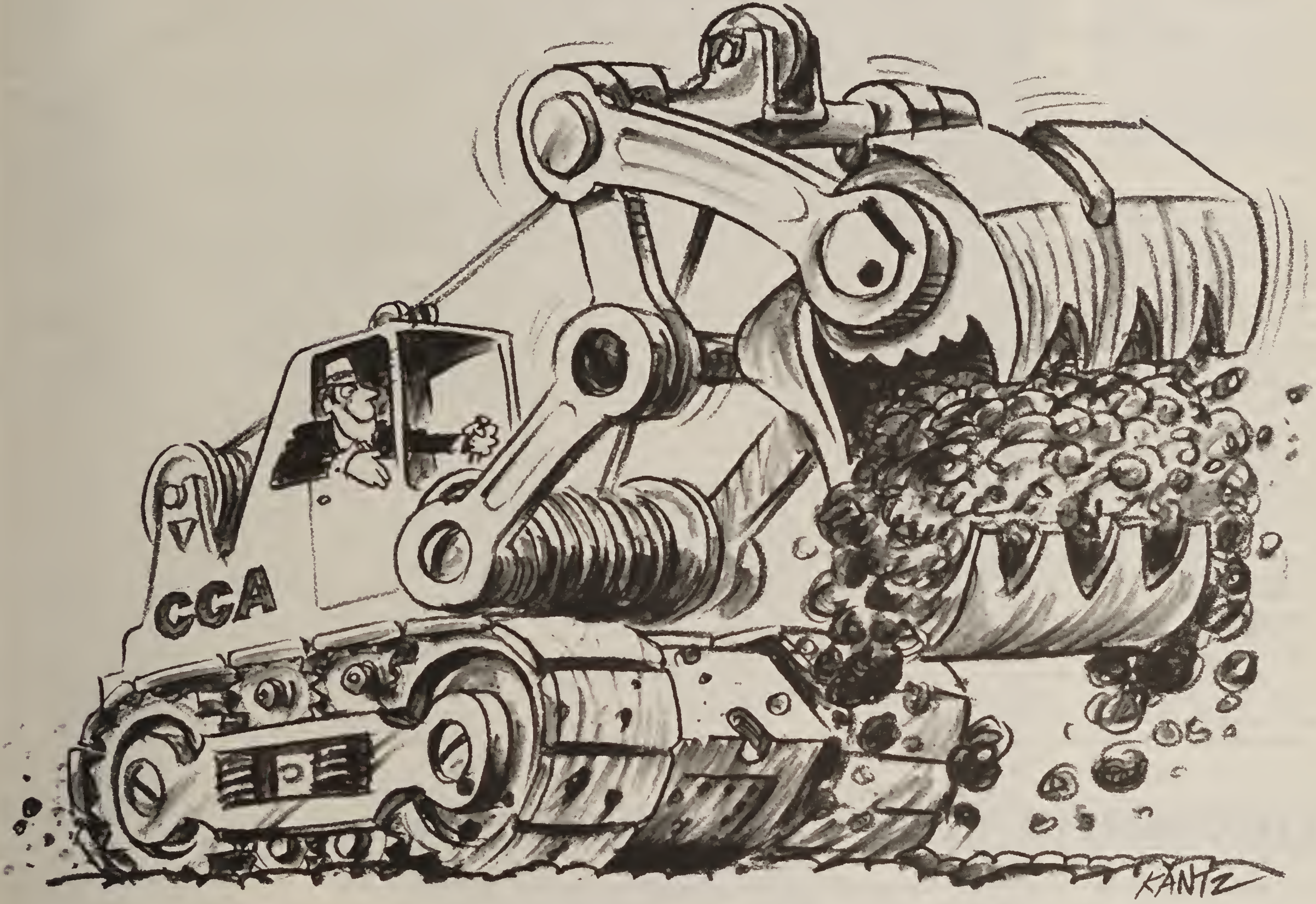

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New Dimensions in Software Productivity.

AT&T strengthens 3B2 minis, ties units to IBM, DEC, Wang

BY JEAN S. BOZMAN
CW STAFF

NEW YORK — AT&T strengthened its 3-year-old line of 3B2 minicomputers last week by adding a high-end Model 600 and connecting the minis to the well-established office environments of IBM, Digital Equipment Corp. and Wang Laboratories, Inc. through systems software.

The connectivity of the 3B2s was promoted by the acquisition of protocol-translation modules from Soft-Switch, Inc., AT&T executives acknowledged. Incorporated within the product name, AT&T Document Exchange, the Soft-Switch translators link AT&T applications to IBM's Professional Office System (Profs) and Distributed Office Support System (Disoss), DEC's Decnet, Ethernet and Wang's VS systems.

The links were designed to promote AT&T sales in non-Unix accounts. "We need to offer systems that can work with whatever profile the customer implements," explained Vittorio Cassoni, senior vice-president of AT&T's Data Systems Division.

Cassoni, along with Jack Scanlon, group vice-president of product development, hinted at a host machine for the AT&T line. The as-yet-unannounced minicomputer, expected out later this year, will be based on multiple microprocessors and will be expandable through the addition of printed-circuit boards, Scanlon said.

AT&T's wide range of announcements failed to address MIS concerns such as the current lack of an AT&T host, observers said. But the observers did emphasize AT&T's recognition that there are standards that will dictate many features of future AT&T systems. Among them are Microsoft Corp.'s MS-DOS, IBM's Systems Network Architecture and Netbios, the International Standards Organization's Open Systems Interconnect and IBM 3270 protocols.

Double the ante

AT&T tops off 3B2 line with the Model 600

	MIPS*	Memory Range (M bytes)	I/O Bandwidth (M byte/ sec.)	Maximum Number of Users	Typical Number of Users	Base Price (memory)
3B2/300	0.6	1 to 4	2	18	six to 10	$12,845 (1M byte)
3B2/310	1.1	1 to 4	2	18	10 to 14	$14,845 (1M byte)
3B2/400	1.1	1 to 4	2	46	15 to 25	$20,845 (1M byte)
3B2/600	2.6 to 4	4 to 16	4	90	25 to 64	$46,500

* Millions of instructions per second, according to AT&T claims.

CW CHART

At the heart of the AT&T office strategy is the 3B2 Model 600 machine, based on an 18-MHz version of the WE32100 chip that powers the 3B2 Models 300 and 400. The 18-MHz chip allows the Model 600 to run at 2.6 million instructions per second, which is about 2½ times as fast as the 3B2 Model 400.

The Model 600 can support 64 concurrent users and is set to be available for delivery in May at a price of $46,500. An industry-standard SCSI interface card will allow the attachment of up to 6.5G bytes of external storage, AT&T said.

AT&T also announced the following:

- The $3,595 AT&T 495 laser printer for AT&T personal computers. The printer, which was built by Genicom Corp., features 300-dot resolution and 10 page/min. performance.
- A version of Unix System V, called Release 3.1, which has been optimized for international communications protocols. Enhancements include improved remote file-sharing performance and decreased response time for remote file access. The release should be available next month for $300 as an upgrade from Release 3.
- A $5,000 version of the Information Systems Network (ISN) software, Release 4.0, that supports extensive DEC connectivity through a high-level interface; a $7,500 remote concentrator for the data-switching system; and a $12,000 network management system called Starkeeper that runs on the AT&T 3B1.
- A Dataphone II 740 Acculink Multiplexer. The system multiplexes data and voice and supports Accunet T1 services. It combines up to 128 voice or data channels and should be available in June at prices ranging from $15,000 to $52,000.
- Starlan PC Servers, Models 310 and 400, priced at $16,600 and $29,500, respectively. The 3B2-based servers use 10-MHz WE32100 chips and offer PC access to Unix applications as well as shared printing and file services.
- A 3B2 Remote Management Package. Priced at $900, the software is said to allow a single 3B2 to manage a network of remote 3B2s.

Last week's wide-ranging announcement is only the first in a series of AT&T product introductions to be made this year, Cassoni said. By December, AT&T's product line is scheduled to include an Intel Corp. 80386-based workstation that will run both MS-DOS and Unix System V, as well as a modular minicomputer that will run a modified version of Unix. Meanwhile, AT&T said it plans to reduce the prominence of the older 3B2 and 3B15 systems. It started by cutting prices for those systems by 12% to 25%.

Cassoni claimed that AT&T's cause is furthered by the mounting number of Unix systems. He noted that 75% more System V licenses were sold in 1986 than in 1985. However, he admitted, AT&T had a market share of just 14% of all installed Unix machines.

"It is not true that people are not using the 3B computer line," Cassoni told those who questioned the market share at the press conference. To that end, he announced the appointment of a 500-person dedicated sales force as a "point of transfer" for new AT&T technology.

Gaps seen in AT&T's approach to MIS

New President Vittorio Cassoni emphasizes adherence to operating standards, connectivity

BY ALAN ALPER
CW STAFF

ANALYSIS

NEW YORK — AT&T's data networking strategy, as articulated by new Data Systems Division President Vittorio Cassoni, represents little that is conceptually different from past approaches taken by the communications giant, analysts and observers said last week.

Cassoni, who presided over AT&T's first major product rollout in a year, stressed AT&T's adherence to operating environment standards, multivendor connectivity and increased focus on sales support. The myriad of products introduced included a high-end addition to its Unix-based 3B2 minicomputer family, bridges to exchange documents with IBM and Wang Laboratories, Inc. systems and increased connectivity with Digital Equipment Corp. computers (see story above).

Under its new strategy, AT&T is addressing computer users in specific work groups and the ability to tie systems together with networking technology, Cassoni said. But analysts said AT&T still seems to lack the understanding required to sell MIS executives on the virtues of their strategy and technology. Cassoni's reference to MIS as the "production work group" bears this out, some analysts said.

Plagues and gaffes

AT&T's three-year attempt to gain entry to the computer business has been plagued by confusion over whether it is selling stand-alone computers or data networking solutions. Such positioning problems, in conjunction with marketing gaffes and a burdensome overhead, caused AT&T to lose $1 billion in the computer business last year alone, analysts estimated.

Cassoni, who said business exceeded budget during the first two months of the year, still has his work cut out for him, they noted.

Other analysts said the firm's data networking strategy represents little more than a rehash of earlier statements of direction. "Their strategy assumes that people want to buy AT&T computers and the only thing that was preventing them from buying AT&T computers was a lack of connectivity," said David Taylor, program director of office systems at the Gartner Group, Inc. in Stamford, Conn.

"What's going on better work over the next 18 months or the corporation is going to pull the plug anyway," one analyst who requested anonymity said. "AT&T has given Cassoni two years to move the Data Systems Division to profitability."

'Tough row to hoe'

AT&T strategy revolves around the belief that MIS can be sold on the virtues of Unix. While acceptance of Unix is growing, AT&T is only one of a number of major firms pushing the operating environment, many of whom have already made deeper inroads into the market.

"It's a tough row to hoe," noted Lee Doyle, an analyst with International Data Corp. (IDC), a market research and consulting firm in Framingham, Mass. "There's a lot of demand for Unix in the government and educational markets, but it's a lot less defined in the commercial market."

William Rich, an analyst with Northern Business Information in New York, said that although AT&T has failed miserably in attempting to sell stand-alone Unix systems, the firm's data communications strategy strikes right at the heart of IBM's weakness — networking — and sets the firm up as an alternative to DEC.

"DEC's proven that networking is the way to go. AT&T will have to try hard to emulate that," Rich concluded.

Yet to compete with DEC, AT&T will have to vastly improve the performance of its 3B2 processor line.

The new 3B3/600 is the first step in getting AT&T in sync with market requirements.

Playing by the rules

"They're in a tough position; they've been playing catch up since divestiture," IDC's Doyle said. "They never seem to catch up because the market requirements keep changing."

Beyond the substance of last week's press conference, AT&T seemed to have a more pressing agenda. Cassoni, who succeeded James Edwards as the chief architect of AT&T's computer strategy in October 1986, needed to increase AT&T credibility in the marketplace after years of tumult.

"Not much of what was announced was revolutionary," said Suzanne Purnell, an analyst at Dataquest, Inc. in San Jose, Calif. "It does appear that there was some image building there and something to do with Vittorio Cassoni and his presence at AT&T."

Computerworld *Midwest correspondent Jean Bozman contributed to this story.*

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XCOM6.2's role: the RJE giant killer

The XCOM6.2 applications suite boasts several advantages over IBM's Remote Job Entry (RJE), which up until now has been the main way to transfer bulk data from IBM and other systems, according to Mark Favelson, marketing manager for XCOM6.2 at Spectrum Concepts, Inc.

First, under RJE, the system requesting data must emulate a dumb terminal such as an IBM 2780, which limits the type of file formatting and requires that only the IBM mainframe host initiate file transfers. XCOM6.2 supports peer-to-peer communications, allowing either system to initiate the transfer.

Second, an RJE-based transfer program must include embedded commands that are specific to the device initiating the request, the host operating environment and the type of communications link. This adds both to the system overhead and to the programmer's job, according to Favelson. In contrast, XCOM6.2 makes use of the fact that LU6.2 is device-independent, able to use the same commands across a variety of communications links and computer hardware.

Third, where RJE emulators work only over remote, low-speed, analog lines, XCOM6.2 supports a wide range of connections including IBM's Synchronous Data Link Control, High-Level Data Link Control and Token-Ring network in addition to CCITT's X.25 and high-speed channel-to-channel interfaces — given that the device running XCOM6.2 supports any given connection.

Fourth, while RJE requires that an IBM mainframe be used as a go-between for all data transfers between non-IBM systems, XCOM6.2 allows direct data transfer among all of the systems it supports.

One current exception is the Digital Equipment Corp. VAX. Because DEC's current implementation of LU6.2 does not include PU2.1 support, VAX/VMS systems currently can only communicate with IBM mainframes via LU6.2.

While several vendors provide interface boards and software that implements LU6.2, such products are programmers' tool kits for developing LU6.2 applications, compared with XCOM6.2, which "you can install, turn on, and away it goes," Favelson said.

John R. Pickens, senior communications architect for Communications Solutions, Inc., said that while several companies have developed applications for LU6.2 internally, "I know of no commercial application that runs on LU6.2." If Spectrum Concepts has come out with one, "I'd be glad to give them the credit for being first," he added.

ELISABETH HORWITT

Early LU6.2

FROM PAGE 1

tion to computers from Wang Laboratories, Inc., Data General Corp., Stratus Computer, Inc. and Tandem Computers, Inc. A Spectrum spokesman refused to comment.

The XCOM6.2 products achieve two more firsts, the vendor claimed: LU6.2 communications applications that can interface with an IBM cluster controller and with IBM's VTAM mainframe network operating system.

IBM's existing LU6.2-based mainframe products reportedly interface with the CICS environment but not directly with VTAM.

This makes XCOM6.2 potentially useful to Travelers Insurance Co. in Hartford, Conn. Travelers is already using IBM's LU6.2 programs as the basis for applications that will provide IBM Personal Computer users with data base access within the CICS environment.

However, the insurance giant would like to be able to provide VTAM-based data access as well, according to Richard Boyle, assistant director of Travelers' computer sciences division.

There is an "obvious overhead" involved in retrieving records using "data base-style languages" associated with CICS, Boyle explained.

Besides improving response time, XCOM6.2's VTAM-based applications would permit Travelers to "store information and have it transferred exactly as I store it ," Boyle said.

XCOM 6.2 applications can be invoked via a menu-based user interface or by other batch or interactive programs.

An XCOM6.2 program can be used to redirect a host spool file to any other computer with a destination address on the XCOM6.2 network, effectively replacing IBM's NJE product, according to Spectrum.

The XCOM6.2 PC program includes background processing software that takes care of communications functions in the background while an application runs in the foreground. The software will run on any PC-DOS system.

First-copy prices for XCOM6.2 are $9,500 for the IBM System/38 and DEC VAX 8000, $8,000 for the VAX 7000 series, $3,000 for the Microvax and $475 for the IBM PC. Commercial release is scheduled for June, with the exception of XCOM6.2 MVS, priced at $26,000, which will be released in May.

Batch file transfer alternatives

Remote job entry	XCOM6.2
Complex device-dependent commands	Simple device-independent commands
Remote, low-speed analog communications	Supports multiple network connections, including high-speed, channel-based and local-area network links
Dumb terminal emulation	Peer-to-peer
IBM host-initiated file transfer	File transfer initiated by any system
Must interface with VTAM through job entry system	Direct VTAM link

CW CHART

Expert system ported to Apollo

BY NINAMARY BUBA MAGINNIS
CW STAFF

CAMBRIDGE, Mass. — Palladian Software, Inc. announced last week that its Management Advisor package, an expert-system business application, has been ported to Apollo Computer, Inc. workstations, marking a first for both companies.

The announcement opens up Palladian's potential market by making the software package available on a general-purpose machine as opposed to the costly LISP engine. Apollo, traditionally a workstation vendor for engineers, scientists and other technical professionals, is branching out into the business, financial and commercial arena.

Palladian would have been handicapped if it continued offering its artificial intelligence application exclusively on LISP machines, according to Harvey P. Newquist III, editor of "AI Trends," a newsletter published in Scottsdale, Ariz., for the AI industry.

"There are probably only 6,000 LISP machines in the world, and the LISP market slowed down in 1986," Newquist explained.

Difference in price

The move to a nonspecialized workstation may make a big difference in price, noted John Sviokla, an assistant professor at Harvard Business School who monitors the AI market for useful business applications. But price is only part of the issue. "Their challenge is to get people to both understand and adopt the perspective of the Advisor. That's the challenge when you use any new tool," Sviokla said.

Competitive workstation vendor Sun Microsystems, Inc. is also seeking customers outside the traditional technical market. Sun recently announced that Morgan Stanley & Co., a New York-based brokerage firm, will purchase Sun systems for automated securities trading.

"Both Apollo and Sun have to look outside their traditional installed base to try to get new customers," observed Vicki Brown, program manager of technical computing for International Data Corp., a Framingham Mass.-based research firm. Management Advisor is the software supplier's new name for its Financial Advisor package, which was announced in March 1986, the vendor said. Advisor software costs $66,000 for a single copy; the cost plummets to about $10,000 for 30 copies and drops further to $5,000 for orders of 50 or more, the vendor explained. The package includes one year of free maintenance with paid support ranging from $5,000 for one copy to $1,000 per copy for 31 or more copies.

The base configuration required to run the AI package includes an 8M-byte memory, a 348M-byte disk and a runtime license for Common LISP, all of which costs $31,500.

Both vendors are hammering out details for jointly offered package deals, which may start in the $75,000 price range. These packages are to be announced later this year.

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New CPUs, micro spill from Unisys bag

BY STANLEY GIBSON
CW STAFF

NEW YORK — Opening up a grab bag of products, Unisys Corp. last week announced two V series small mainframes, a multiuser microcomputer based on the Intel Corp. 80386 microprocessor and links between former Burroughs Corp. and Sperry Corp. machines.

Unisys announced the connection of the former Sperry's IBM-compatible personal computers to the former Burroughs' microcomputer network and micro-to-mainframe connectivity across both Burroughs and Sperry product lines.

In addition, Unisys announced a so-called "semantic" relational data base offering and enhancements to a fourth-generation language.

The new offerings are "the first true Unisys products" and the first to bear the Unisys label, according to Unisys Vice-Chairman Joseph J. Kroger.

Kroger, who before the merger of Burroughs and Sperry was president and chief operating officer of Sperry, professed that the combined firm is stronger than either company was on its own. He said that all corporate consolidations are now in place and that no more are planned. However, he added, former Burroughs and Sperry sales agents will be increasingly trained in cross-selling the equipment of each former vendor.

The new V series models, the V 510 and V 530, double and quadruple, respectively, the performance of former Burroughs V 340 and V 380 general-purpose mainframes. Although the V 340 and V 380 hardware cannot be upgraded to the new processors, software written for the previous machines can be used on the new ones.

The V 510 includes a CPU with 20M bytes of memory, a data transfer module and an I/O cabinet. The memory can be expanded to 80M bytes. The V 530 includes 40M bytes of memory, a 40K-byte cache and two data transfer modules. The memory is expandable to 160M bytes.

The base price of the V 510 system is $950,000, and the base price of the V 530 is $1.77 million. The V 530 is set to be delivered in the fourth quarter of this year, while V 510 delivery is set for the first quarter of 1988. The V 510 can be field-upgraded to the V 530 system.

Infoexec, the semantic data management system, runs on Unisys A series and B5900, B6900 and B7900 mainframes.

"Relational technology captures items of information and joins them together through external means. In contrast, semantic data management captures data relationships as part of the data base," said William Maclean, program manager for systems software.

The data base management system will reportedly be available in September. Priced according to a tiered structure, license fees range from $570 per month on an A 2 model to $3,100 per month on an A 15 model. A five-year purchase plan is priced from $19,266 to $151,900.

Unisys also announced Release 13.0 of its Logic and Information Network Compiler II (LINC II), the former Burroughs fourth-generation language. The new version will feature the ability to download some application functions and data from a host system to workstations based on the former Burroughs' BTOS and Microsoft Corp.'s MS-DOS. LINC II Release 13.0 is priced from $14,000 to $250,000 and is slated to be available in the third quarter of this year.

Sets early stake in 386 game

NEW YORK — Unisys Corp. added to its B25 multiuser workstation line by unveiling last week the B38, based on the Intel Corp. 80386 microprocessor.

The B38 runs BTOS, the Burroughs multiuser, multitasking operating system, and as an add-on feature, the B38 can run Microsoft Corp.'s MS-DOS. Unisys Vice-President Fred R. Meier said a future version will run BTOS and MS-DOS and that steps will be taken to remain compatible with whatever 80386 standard IBM sets.

The B38, manufactured by Convergent Technologies, Inc., is available in two versions, one with a 10-MHz Intel 80287 math coprocessor. Both can expand memory to 4M bytes. The B38 supports up to 11 cluster workstations and runs twice as fast as the B28.

A base configuration of a B38 processor, display and keyboard, 1M byte of memory and 20M bytes of disk storage costs $8,375.

Unisys also announced Clustershare, which allows personal computers running MS-DOS to operate in a BTOS cluster with any member of the B25 workstation family.

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Printer hits 600-dot resolution

BY PEGGY WATT
CW STAFF

EAST HANOVER, N.J. — Varityper is set to announce next week what it claims is the highest resolution laser printer available commercially.

The printer supports Adobe Systems, Inc.'s Postscript page description language and is said to produce 600 dot/in. resolution, double that of most laser printers now available, according to Varityper and sources who have seen the system.

The VT-600 will be priced at $18,760 and is scheduled to be available in June. It will be sold by Varityper and through OEMs, according to Mike Turetsky, national sales support specialist.

The printer produces 10 page/min. and uses the Adobe Postscript raster-image processor, according to technical specifications from Varityper.

A Varityper spokeswoman said the VT-600 is based on a Motorola, Inc. 68020 microprocessor but declined to say what engine it uses, "at the manufacturers' request."

While the VT-600's crisper resolution may be of interest to businesses that use laser printers for office documents, the near-typeset quality is also aimed at internal corporate and professional publishers.

The VT-600 uses the Postscript protocol and accommodates Postscript and Varityper font libraries. Eight fonts in the Courier and Varitimes type families, as well as the Adobe symbol set, are available in read-only memory, according to Varityper's specifications. Varityper will redesign its entire library of 1,200 typefaces and release them 30 to 50 at a time during the next year, the vendor said.

Products bombard NCGA

But training, service issues draw lively talk at expo

BY ALAN J. RYAN
CW STAFF

PHILADELPHIA — The rollout of some 300 products marked the NCGA Computer Graphics '87 conference and exposition here last week, but longstanding issues were foremost in the minds of many attendees.

Computer graphics users converged upon 200 booths to see the products, including a three-dimensional display terminal from Prime Computer, Inc., which was developed with Silicon Graphics, Inc. and MIPS Computer Systems, Inc.

Targeting the vibrant market for Digital Equipment Corp. systems, Autodesk, Inc. announced the addition of DEC's Vaxstation 2000 and Vaxstation GPX workstations to its list of supported 32-bit platforms.

Both DEC and a limited number of Autocad dealers will distribute the VAX version of Autocad 2.6 for the workstations under the VMS operating environment. Shipments are slated to begin in the second quarter, and suggested price is $2,850.

Noticeably lacking were major announcements at the show from IBM, which recently announced an interface to the Graphical Kernel System (GKS) for users of its Graphical Data Display Management mainframe graphics system. The interface was developed by Uniras, Inc.

While many users attended the show to see the new products, those polled said they had other reasons for attending as well.

The users explained that their needs and wants have basically remained the same in an industry that is growing rapidly and that they want the vendors to meet those needs.

They said they still want faster equipment; better training, support and documentation; more input into what vendors add or change in upgrades and enhancements; more memory; increased system integration; smaller unit footprints; and, of course, lower prices.

"Users want good training," Gary Whittaker of Ford Motor Co. said during a technical session on what users want from vendors. He asserted that while training is often provided, users find it difficult to apply that training to real projects.

One area many users agreed they would like to see addressed by vendors is allowing users to help direct product enhancements, especially in graphics software. "User groups should be there at the design specification stage and should actually have to sign off before the code is written," Whittaker said.

Graphics standards and what they mean for users was listed by many as a top priority.

Members of the Technical Office Protocol (TOP) and the Manufacturing Automation Protocol (MAP) committees maintained that users want to know what type of graphics hardware and software they should buy and whether users will fare well if they follow standards.

Debbie Cahn of Boeing Computer Services pointed out that the base standards developed by the International Standards Organization, the American National Standards Institute and the Consultative Committee on International Telephone and Telegraph leave some loose ends.

"The user needs functional standards built on top of base standards to tie up the loose ends," she said.

The TOP and MAP committees support the GKS, and it will be included in TOP Version 3.0, she said. The application program interface includes GKS and will soon include GKS-3-D and Programmers Hierarchical Interactive Graphics Standard. Additionally, Cahn noted, the device interface, the computer graphics metafile, the computer graphics interface and the computer graphics extended metafile will all be considered for future versions of TOP.

Cadds line pumped up

BY ROSEMARY HAMILTON
CW STAFF

Computervision Corp. introduced the next generation of its computer-aided design and manufacturing (CAD/CAM) system last week and announced software enhancements for this workstation-based product line.

In announcements made at the NCGA Computer Graphics '87 conference in Philadelphia, the vendor said its personal computer-based design package, Personal Designer, is now available for the Compaq Computer Corp. Deskpro 386.

The Caddserver 34 is based on the Sun Microsystems, Inc. processor, which is based on the Motorola, Inc. 68020 chip with a 25-MHz clock speed. The Caddserver 34 will be available in the third quarter, Computervision said. Like the Sun system, it reportedly processes data at a rate of 4 million instructions per second (MIPS). Upgrade packages will be offered for users of the older system, the vendor said. Computervision will offer the new system initially as a network server. A stand-alone version is expected sometime in the fourth quarter.

A typical Caddserver 34 starts at $90,400. In addition to Release 3.2 of the Sun operating system, the system includes 16M bytes of main memory, a 515M-byte hard disk, a ½-in. tape drive, an Ethernet interface and a color monitor. The upgrade package will cost $35,000.

The vendor also introduced Tech Pubs II, a technical publishing software package consisting of two modules. The $7,000 Technical Documentor allows users to integrate Cadds 4X, Computervision's CAD/CAM graphics software, with text. It includes multitasking windowing capabilities and can be used for design and layout.

The $2,500 Engineering Notebook module allows users to maintain notes in a separate window. Comptervision said both will be available in the third quarter. The software is a joint effort between Computervision and Omnipage Corp.

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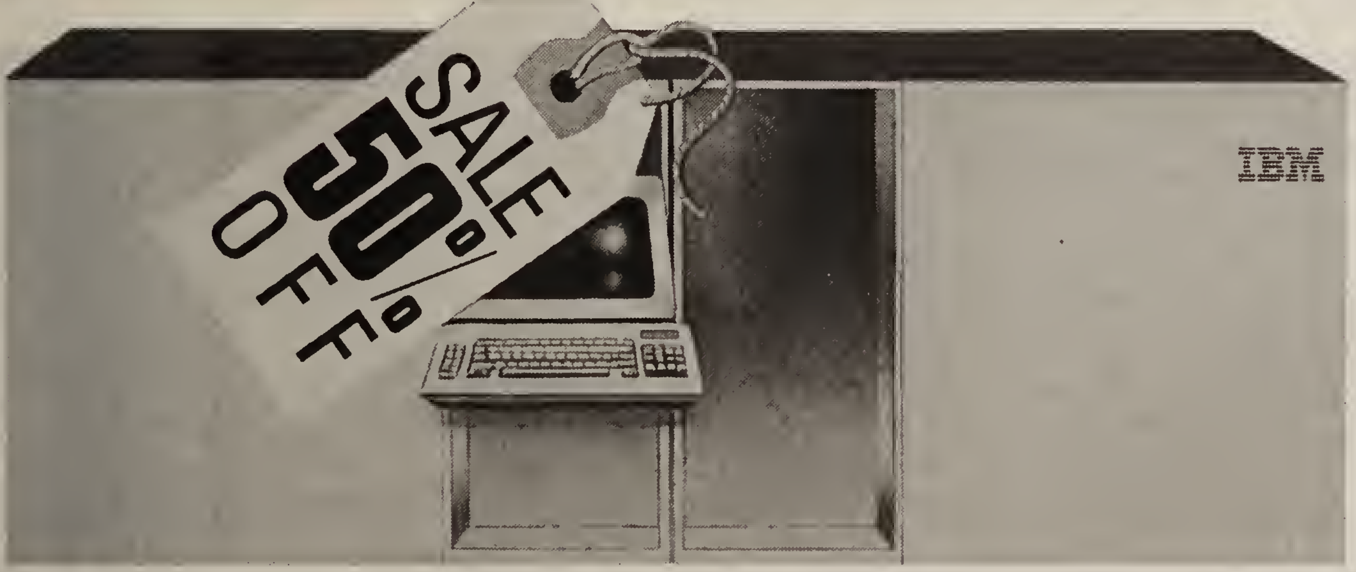

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AZ	Phoenix	Apr 15, Jun 3
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CA	Concord	Jun 10
	Los Angeles	Apr 7, May 12, Jun 16
	Newport Beach	May 5
	Pleasanton	Apr 8
	Sacramento	May 5
	San Diego	May 14
	San Francisco	Apr 9, May 7, Jun 16
	San Jose	Apr 30, Jun 18
CO	Colorado Springs	Apr 21
	Denver	Apr 16, May 5, Jun 25
CT	Hartford (Farm.)	May 5
DE	Wilmington	May 5
FL	Tampa	Apr 8
GA	Atlanta	May 6
IA	Des Moines	Apr 15, Jun 17
ID	Boise	Jun 4
IL	Chicago	Apr 9, May 14, Jun 11
	Springfield	May 7
IN	Indianapolis	Apr 22, May 20, Jun 25
KS	Wichita	Apr 2
KY	Louisville	Apr 8
LA	New Orleans	Apr 15, Jun 26
MA	Boston	Apr 15, May 14, Jun 10
	Springfield	Apr 9
MD	Baltimore	Apr 2, Jun 24
	Bethesda	Apr 7, Apr 15, Apr 21, May 5, May 13, May 19, Jun 4, Jun 10, Jun 18
ME	Portland	Apr 22
MI	Detroit	Apr 7, May 12, Jun 9
	Grand Rapids	Apr 9
MN	Minneapolis	Apr 23, May 13, Jun 30
MO	Kansas City	Apr 9, Jun 9
	St. Louis	Apr 14, May 12, Jun 16
NE	Omaha	Jun 2
NJ	Iselin	Apr 1, Apr 15, Apr 29, May 13, May 19, Jun 11, Jun 25
NM	Albuquerque	Apr 30
NV	Las Vegas	Apr 1
NY	Albany	Apr 23, Jun 17
	Buffalo	Apr 8
	New York City	Apr 8, Apr 16, Apr 22, May 6, May 14, May 21, Jun 16, Jun 24
	Rochester	Apr 16, May 14, Jun 11
OH	Cincinnati	Apr 22, Jun 17
	Cleveland	Apr 1, May 5, Jun 2
	Columbus	Apr 2, May 6, Jun 3
	Dayton	Apr 21, Jun 16
OK	Oklahoma City	Apr 7, May 29
	Tulsa	Jun 16
OR	Portland	May 7
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	King of Prussia	Apr 23
	Philadelphia	Apr 9, May 7, Jun 11
	Trevose	Jun 30
SC	Columbia	Apr 7
TN	Nashville	Apr 9
TX	Amarillo	Apr 7
	Austin	Apr 1, Jun 11
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	Houston	Apr 9, May 7
	San Antonio	Apr 2, Jun 10
UT	Salt Lake City	Apr 29, Jun 18
VT	Burlington	May 6
WA	Seattle	Apr 7, May 12, Jun 24
WI	Madison	Jun 23
	Milwaukee	Apr 29, Jun 9
WV	Charleston	Apr 15

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Calgary	May 19
Edmonton	Apr 14
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Ottawa	Apr 2, May 7, Jun 4
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DEC factory push on overtime

BY ROSEMARY HAMILTON
CW STAFF

BOSTON — Digital Equipment Corp. continued its push for the factory systems market last week with an announcement that included an integration service along with a host of hardware and software offerings.

"This is a reinforcement of what's been going on — DEC's big push for the factory market," said Tony Friscia, president of Advanced Manufacturing Research Co. "It strengthens their overall position, which is already strong."

Services customized

Key to the announcement is DEC's plan to provide customization services. Integration of the various factory-floor devices is the most difficult challenge facing manufacturers.

By adding Manufacturing Systems Integration Services to its lineup of factory hardware and software, DEC is now providing a well-balanced solution, analysts said.

Last week's introductions numbered 18, one-third of which are versions of Microvax II and PDP-11 hardware that have been ruggedized for factory-floor environments.

The Industrial VAX (IVAX) 630, based on the Microvax II, starts at $32,615. It will also be offered as a complete system with DEC's Baseway software for $63,050.

The IVAX 630 is intended to collect data and control manufacturing operations.

With Baseway, which includes communications capabilities to link factory-floor devices to a computer, the IVAX 630 can serve as a cell host.

The Industrial VAX 620 is based on an RTVAX processor and was designed specifically for real-time applications, according to the vendor.

It is set to be offered in a diskless configuration for $11,330. In a disk-based system, it will sell for $23,930.

Offers Industrial PDP-11

DEC said it also plans to offer the Industrial PDP-11 for those installations that have been using PDP-11s for factory operations.

The industrial version will enable users to move their RSX-11-M-Plus software to the factory floor, DEC said.

Based on the MicroPDP-11/83, this product starts at $29,315.

All three industrial systems are scheduled for July availability.

Sealed versions of each system, intended for particularly harsh factory environments, are scheduled to be available in the fourth quarter this year, according to the vendor.

Pricing is not yet available on the sealed systems, the vendor said.

Also announced last week was Decscan, a controller with supporting software that will enable users to link certain factory-floor devices to Industrial VAXs, including all devices that support the Intel Corp. Bitbus open-architecture interconnect, the vendor said.

Decscan and Baseway software serve similar purposes, however, Baseway is specific to programmable-logic controllers. Decscan costs $3,000.

A Decscan software tool kit that allows users to write data acquisition and control applications was also announced and will sell for $2,600. Both Decscan and the software tool kit are expected to be available in July, the vendor said.

Enhancements to Baseway that will expand the number of devices it supports were also introduced.

Baseway currently supports programmable-logic controllers from Texas Instruments, Inc. and Siemens AG, in addition to those from Allen-Bradley Co. and Gould-Modicon.

Baseway has a starting price of $25,000, and the enhanced version should be available in July.

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This connection allows DEC users to access IBM mainframe power to run complex CAD pro-

CDC system crosses multivendor threshold

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Control Data Corp., a company that clung to its niche markets during several years of financial trouble, last week acknowledged the need to deal with other vendors in a drive into new areas with its first departmental system.

The two models of the Cyber 930, announced at a press conference here, are aimed primarily at CDC's installed base of 900 organizations, two-thirds of which are concentrated in technical computing markets such as education and the petroleum and electrical power industries.

However, CDC officials said the 930, with a base CPU price of $59,900, will also key a drive for new users as the company targets 1,500 potential customers during the next few months. CDC emphasized price/performance benefits in the 930 and the ability of the Cyber 180 product line, including the 930, to coexist with other vendors' equipment or to support migrations from non-CDC equipment.

In addition, the announcements included enhancements of CDC's NOS/VE operating system with shells designed to allow users familiar with Unix and Digital Equipment Corp.'s VMS to continue programming in their own languages with NOS/VE coordinating the commands in the background. A new software product, Desktop/VE, allows use of an Apple Computer, Inc. Macintosh with a 930.

CDC introduced CDCNet Release 1.2, an enhanced version of its communications network with the ability to transfer files between CDC hosts and IBM mainframes running IBM's Network Job Entry. The company also announced plans to add to its Cyber 910-300 line of workstations, which are based on Silicon Graphics, Inc. machines, with the resale of a reduced instruction set computer introduced last week by Silicon Graphics, Prime Computer, Inc. and MIPS Computer Systems.

'Earned our stripes'

"We are not arrogant enough to believe that CDC will be a total systems solution in customer environments today, except in certain privileged circumstances where we've earned our stripes over the years," said Gil Williams, CDC vice-president of computer systems.

"There is a lot of equipment from different manufacturers out there. While we certainly have prestigious customers, we don't enjoy the huge customer base that some of our larger competitors do, and it is not our style to demand a single-source solution. Our aim is to help all these multivendor machines work better together in the customer's environment," he said.

The entry-level 930-11 is available now and, according to CDC, is rated at 1.8 million instructions per second (MIPS). That system can be upgraded through a microcode change to a 930-31, the company said. CDC rated the 930-31, set to be available in August, at 3 MIPS.

A 930-11 CPU with 8M bytes of memory and a one-year warranty costs $59,900. A 930-11 entry-level system with five peripheral processors, printer, tape drive, 828M bytes of disk storage, 16 communication lines and annualized basic software costs $156,016. The 930-31 CPU starts at $125,900.

The pricing is more aggressive than one financial analyst expected. Jonathan Fram, of New York brokerage house Bear, Stearns & Co., said CDC's customer base should be interested in the 930 but that in pursuing new users, CDC — like other companies — faces "quite a bit of entrenchment" with other vendors. "They have done well to cast the latest materials technology into their machine architecture," he added.

TWO GOT ALONG

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CPU, system target forms integration

BY JAMES CONNOLLY
CW STAFF

SAN JOSE, Calif. — Plexus Computers, Inc., a multiprocessing vendor that has focused on the commercial MIS market rather than the scientific computing arena, is expected to introduce today a high-end CPU and a series of products designed to integrate diverse forms of data and business documents.

The Plexus Extended Data Processing (XDP) system reportedly merges its Unix-based processors with IBM Personal Computer AT-compatible microcomputers, optical and magnetic storage systems, an Ethernet local-area network, document scanners, optical character readers, facsimile machines and data base software.

XDP was designed to capture, store, catalog, manipulate and retrieve information in various forms, including text, alphanumeric data and images.

"The Plexus XDP system is a breakthrough in commercial data processing, providing a solution to complex data processing problems that could never be managed by traditional computer systems," said Paul Klein, Plexus president and chief executive officer.

"No other commercial computer integrates so many previously incompatible hardware and software components or integrates so many various types of data," he added.

XDP is built around the new Plexus P/95 or the previous high-end P/75 CPU in a production environment or a P/55 CPU in a development system. It also features a Cygnet Systems, Inc. jukebox-style optical storage facility.

Software includes the XDP Dataserver package, which is based on AT&T Unix System V and application development modules. The XDP Workstation software operates under Microsoft Corp. Windows and Microsoft MS-DOS 3.1 and features a library of mixed-mode data manipulation routines and an extended SQL processor.

The P/95 is based on 25-MHz Motorola, Inc. 68020 microprocessors, rather than the 12.5-MHz 68020 used in the P/75. In addition to its use in XDP, the P/95 is offered for departmental applications. It provides up to 48M bytes of memory and 6.7G bytes of magnetic disk storage and supports up to 128 users.

The P/95 costs $57,200 with 4M bytes of memory, 16 ports, 142M bytes of disk storage and a cartridge tape drive. Prices for XDP range from $75,000 for a P/55-based developmental system to more than $1 million. A typical production system based on a P/75 or P/95 costs $150,000 to $200,000 with four workstations, a scanner, software and a laser printer.

ADR training tool on block

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) is seeking a buyer for its computer-based training system, ADR/PC Adroit, *Computerworld* has learned.

Adroit, which has been on the market for three years, enables organizations to develop and conduct courses on a broad range of software using a personal computer. The system also supports the integration of videotape and disk programs.

ADR President Dennis Strigl said the Ameritech subsidiary is interested in selling Adroit because it no longer fits with ADR's product strategy, which includes programming languages, relational data base management systems and programmer productivity tools. "[Adroit] requires a different kind of buyer and marketing plan," he noted.

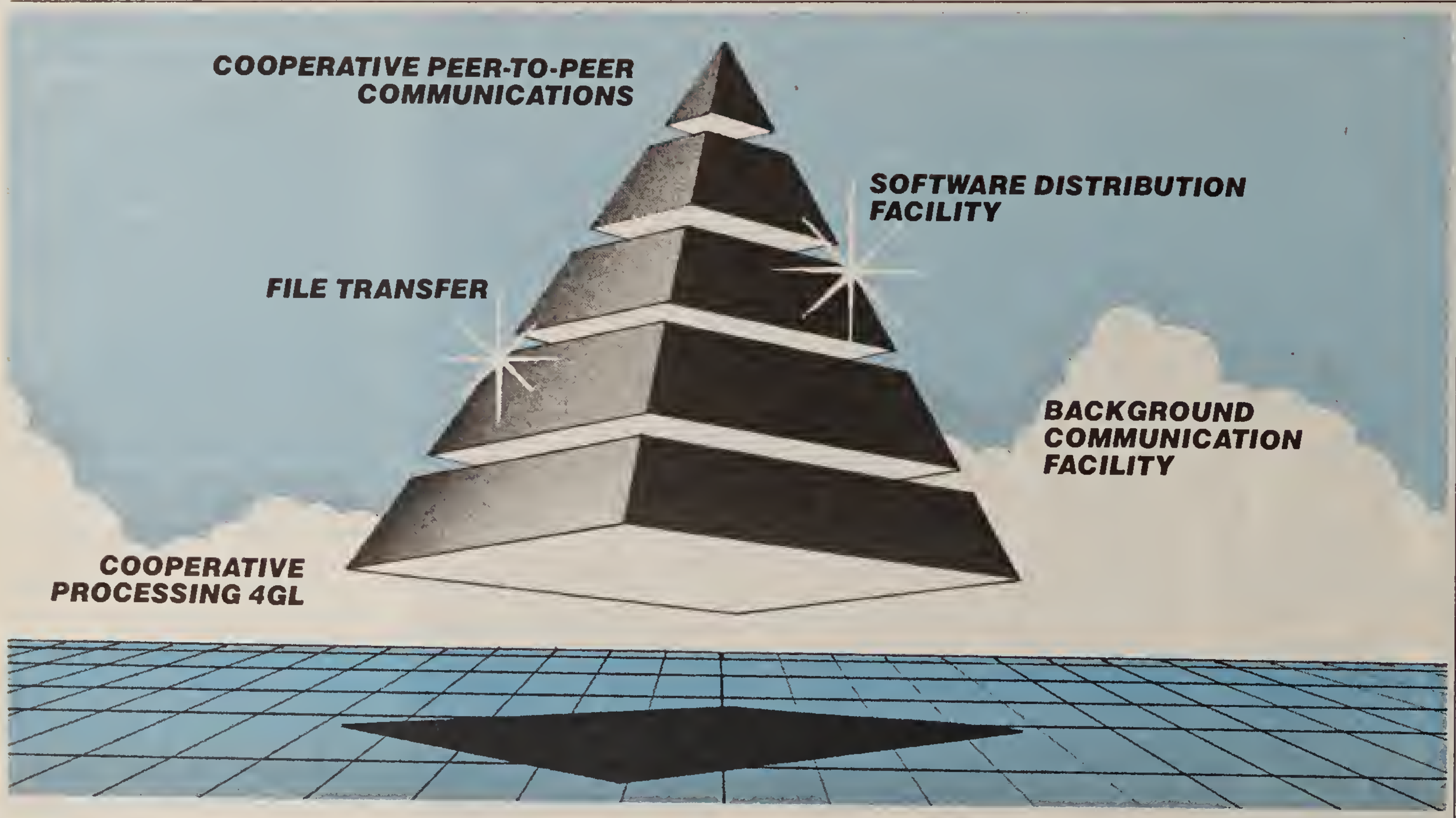
ADR said a number of organizations, which it declined to identify, had expressed an interest in acquiring Adroit. During the course of these discussions, ADR said, it will continue to enhance Adroit. "We remain firmly committed to educational programs for our own clients," ADR said in a prepared statement.

Potential buyers

ADR declined to say whether any offers have been made for Adroit. One source said the product was shopped around the industry but no offers were made. In addition, the source said a group of former employees is interested in purchasing the system, although a formal offer has not yet been made.

"We're not willy-nilly holding the product out to the market and saying, 'Come take it off our hands,' " Strigl said. "We're being very methodical about finding a buyer and will talk to those who will continue to support and enhance the system."

ADR said about 110 customers are using Adroit and that the decision to sell Adroit is an isolated incident. The firm added that it does not expect any other major changes in its product line or overall strategic direction.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Gould claims minisuper hits 96 MIPS, draws bead on VAX

BY NINAMARY BUBA MAGINNIS
CW STAFF

FORT LAUDERDALE, Fla. — Gould, Inc. last week introduced two entry-level members of its new NP1 family of minisupercomputers, claiming that the high-end machines, slated to be delivered next year, will operate at up to 96 million instructions per second (MIPS) and 300 million floating-point operations per second (MFLOPS).

The 40 possible configurations of the NP1 represent Gould's initial offering in a planned family of N-Processor Line (NPL)-compatible systems targeted at the computer-intensive real-time scientific and engineering markets, the vendor said. Because the machines can house large amounts of memory — up to nearly 4G bytes on the high end — Gould will also sell the NP1 in data-acquisition and data base systems and large multiuser environments, the company said.

The entry-level single-processor NP1, the Model 110, reportedly can be configured with up to 512M bytes of memory. The dual-processor Model 120 contains two CPUs and 256M bytes of memory and can be expanded to 512M bytes using 1M-byte chips. Both systems are scheduled for delivery by September.

Gould said that two, three or four system buses can be linked together to configure systems including four, six or eight CPUs, respectively. The eight-CPU Model 480 will allow for 1G byte of memory using 4M-byte chips, the vendor said. The high-end NP1 is slated for delivery by early next year.

The NPL processors can link to Gould's superminicomputers, the real-time Concept/32 and Selconnection and the Unix-based Powernode systems, according to the vendor.

One-on-one with VAX

Gould is pitting the minisuper against the Digital Equipment Corp. VAX 8800, a 10-MIPS processor. "They want to say to all those people thinking of buying an 8800, 'Here's an alternative product that's more powerful and comparably priced,' " said Sandy Gant, vice-president of small systems research for Infocorp, a Cupertino, Calif.-based market research firm.

"It is approaching Cray performance at half the price at the top end," Gant added, referring to supercomputers from Cray Research, Inc. "If a start-up comes out with a hot new box, they would have to align themselves with a systems supplier. Gould already has distribution channels in place, an installed base and customers."

There are no NP1-installed beta-test sites, but Purdue University's Electrical Engineering Department is slated to receive the first minisuper, a Gould spokesman said.

"The first thing we'll do is make it work. We have a reputation for breaking machines," observed George Goble, a Purdue senior computer systems engineer. "Gould has sent us machines in the past. We found bugs and worked Gould hard [to rectify them]."

Goble said he has high expectations for the 100-MIPS machine, explaining that the university will first work with a two-processor system that offers about twice the performance of the Gould 9080 supermini. "We've noticed that once we have over 100 users with a 16M-byte computer, we start paging and probably run two to three times slower when paging is in process," he added. With increased memory on the NP1 system, Goble said, he expects paging will not be necessary, which will boost performance two to three times.

"I think it's a major, positive announcement for the company as a whole," reported Julian Menear, an investment analyst for the Pershing Division of Donaldson, Lufkin & Jenrette, Inc., a New York-based brokerage investment banking firm. "This system is offering supercomputer power and reliability at a minicomputer price. It's a significant achievement."

Sizable sales eyed

Menear predicted NP1 sales will reach $75 million next year and account for approximately one-tenth of Gould's total sales, or about 20% to 25% of computer revenue.

The NPL computers will run on Gould's UTX/32, a compatible multiprocessor extension of the Unix operating system used on the firm's Powernode machines.

The NP1 Model 110 with 64M bytes of memory will reportedly list at $395,000. The dual-processor Model 120, with 256M bytes of memory, is slated to cost $595,000. The high-end 96-MIPS 320-MFLOPS NP1/Model-SP 480, which can service more than 1,000 users simultaneously, is scheduled to cost $2.9 million, Gould said.

The configuration will include eight CPUs, 1G byte of memory with an arithmetic-accelerator scientific processing option and the UTX/32 operating system. Additional memory is set to be priced at $64,000 per 64M-byte module and $32,000 per 16M-byte module.

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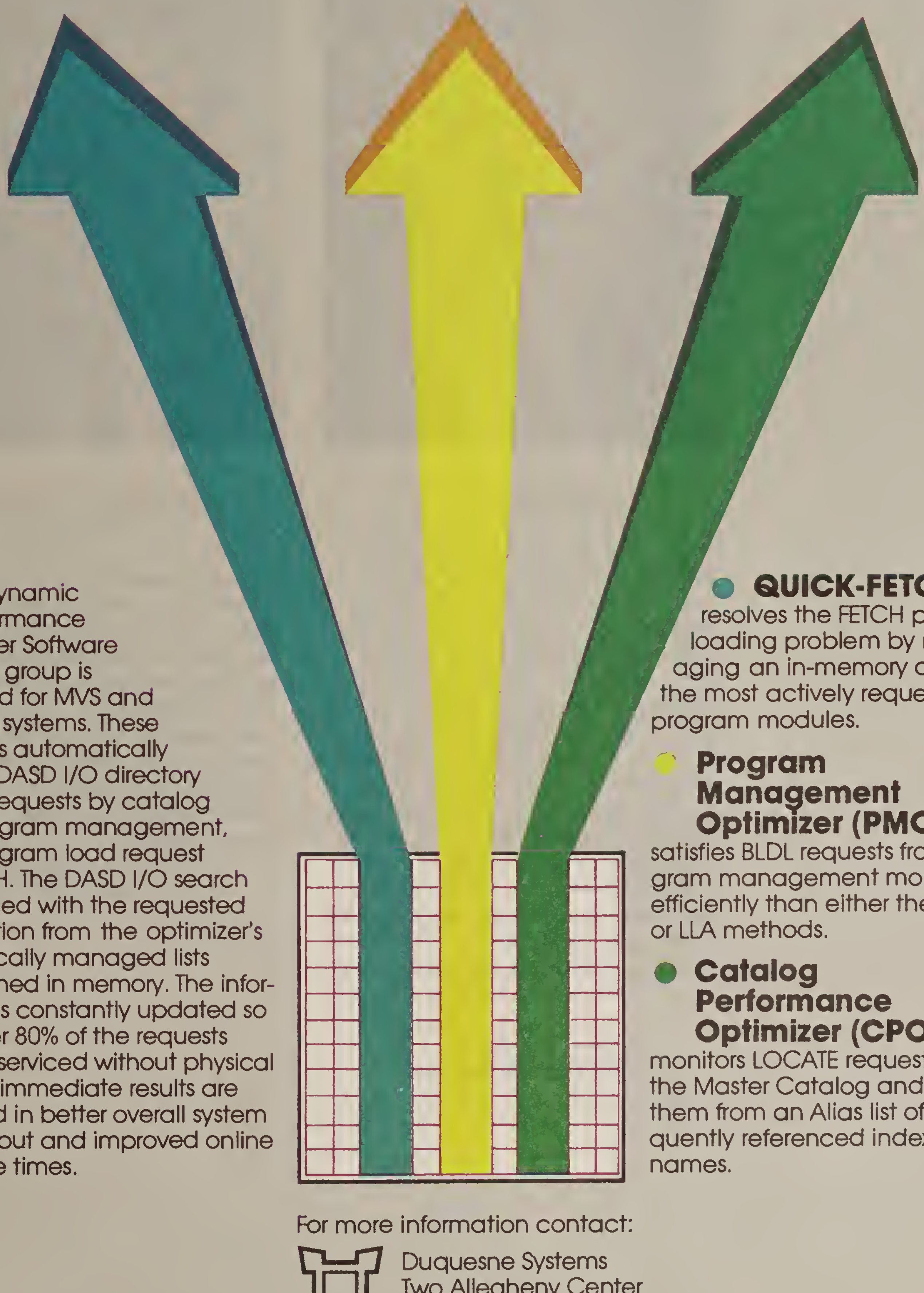

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Product parade to spice show

Everything from gateways to satellites will be unveiled at Interface '87

BY DONNA RAIMONDI
CW STAFF

LAS VEGAS — Interface '87, opening today, will be the setting for a number of product announcements ranging from modems to satellite systems.

Among those expected announcements are the following:

- Teltone Corp. is scheduled to show two additions to its data-over-voice products. Tellan is a 1M bit/sec. local-area network that transfers data simultaneously with voice on the existing telephone wiring. Tellan costs $324 per port, or $13,960 for a typical 43-port system.

Teltone will also release its DCS-3B data-over-voice multiplexer, an extended speed and range version of its data-carrier system for transmission of asynchronous data at 19.2 bit/sec. DCS-3B has two circuit cards that multiplex and demultiplex the data carried above the voice band. It costs $17,734 for a typical configuration of 48 channels, or $369 per channel.

- Microtel, Inc. is expected to release its VSAT satellite system, Spacetel DS2100, for communication of large, dispersed data networks.

Spacetel is said to transmit and receive voice and data communication. Distantly located Spacetel terminals provide communication links to one another via leased satellite circuits. The terminals interface with voice and data equipment or public and private networks.

- Emulex Corp. plans to introduce its synchronous serial dial-line modem. The HF144, with a maximum data rate of up to 14.4 bit/sec., and the HF96, with a maximum rate of 9.6 bit/sec., cost $355 and $255, respectively.

The half-duplex modems are said to be acceptable in any dial-network application in which fast one-way transmission with occasional line turnaround is needed.

- General Data Comm Industries, Inc. is expected to show a line of desktop modems — the Desktop 201, 202, 208 and 9600. The modems make extensive use of custom very large-scale integration devices and have switchable options and built-in diagnostics, according to the vendor. They range in price from $400 to $2,000.
- Paradyne Corp. plans to announce its Analysis 6510, a network management system that offers network diagnostics, control for Paradyne modems, multiplexers and digital transport products, reporting functions and network administration. The system is reported to support up to three operator consoles, two system printers, 150 diagnostic ports and 2,000 devices. Entry-level price is $21,250, which includes a controller, console and printer.

Paradyne is also scheduled to release its 3400 series of network diagnostic modems. The $8,900 Model 3450, with 14.4K bit/sec., and the $11,500 3470, with 19.2K bit/sec., have two-channel buffered time-division multiplexers, analysis network management diagnostics and automatic call-and-answer dial restoral. The modems support point-to-point and multipoint tail circuit applications.

- Canoga-Perkins is slated to introduce its Model 3124 T1 voice and data multiplexer for both short- and long-haul applications. The unit is Canoga-Perkins' first entry into the twisted-pair four-wire T1 marketplace. It costs between $7,000 and $15,000, depending upon configuration.
- Okidata is set to release its 9600 bit/sec. syncronous modem for use on dial-up or dedicated telephone lines. The $1,495 CLX96DP complies with CCITT V.29 requirements for 9600 bit/sec. transmission and meets Federal Standard 1007 for government applications.
- Telematics International, Inc. plans to debut its Series 200 Programmable Communications Processor (PCP) for 10 to 34 communications ports. The $15,000 PCP provides access to Telematics' Net 25 packet-switching networks.
- Adacom Corp. is expected to show Adaprint/PC, a personal computer interface board that allows IBM 3287 emulation on a variety of ASCII printers. The board costs $790.

Adacom also plans to announce its LG-708 local-coaxial gateway that provides remote micro-to-mainframe access and IBM 3270 connectivity into existing local and wide-area networks and private branch exchanges. The LG-708 costs $468 per port and can connect up to 16 devices.

- Performix Software Corp. is scheduled to release the Network Performance Expert (Net/PX) software for performance analysis, capacity planning and mapping of synchronous and asynchronous data communications networks. The package runs on an IBM Personal Computer or compatible system running IBM's PC-DOS 2.0 or higher with a minimum of 256K bytes of memory and a hard disk. Net/PX requires two classes of data — a description of the network topology and a description of the message traffic. The single-copy license costs $3,800.
- ISC Datacom plans to announce two radio frequency modems: The 19.2K bit/sec. Model 1019 and the 56K bit/sec. Model 1056, both of which include menu-driven interfaces for control and monitoring as well as local and addressable remote control of frequency, power, format and diagnostics. The 1019 costs from $1,695 to $1,870, depending on frequency. The 1056 costs from $2,190 to $2,365.

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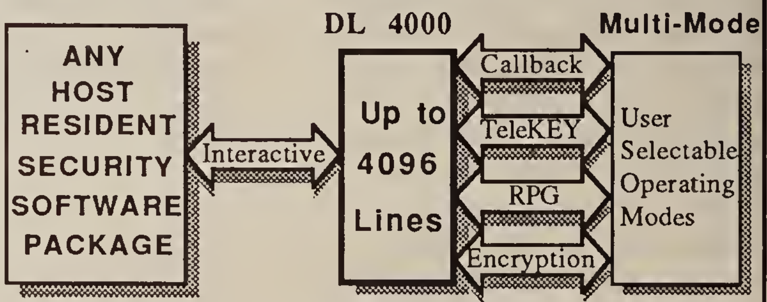
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Tool spans Unix-Ethernet gap

BY DONNA RAIMONDI
CW STAFF

SIMI VALLEY, Calif. — Micom Systems, Inc. last week announced a networking hardware and software package that reportedly allows Unix System V Release 3 users on Intel Corp. 80386-based personal computers to directly connect to Ethernet.

With the 80386 system and Unix, users of the $1,390 Micom NP622 networking package will have the basic tools to do development for applications that are immediately networkable, according to Gabe d'Annunzio, who is vice- president of marketing at Micom-Interlan, Inc., the Boxborough, Mass., Micom subsidiary that developed the product.

The product consists of the NP600 protocol processor board, Excelan Corp.'s Transmission Control Protocol/Internet Protocol (TCP/IP) software, a software license, documentation and an array of hardware for installation.

Team effort

Micom worked in collaboration with Interactive Systems Corp. in Santa Monica, Calif., the company selected by Intel to adapt AT&T's newest Unix version for 80386-based systems. "Our collaboration ensures that Interactive Systems' port of Unix is automatically able to talk on Ethernet, because the Streams driver to our network controller is built into the port," d'Annunzio said.

The Streams feature of Unix allows users to write customized networking or other code into the standard Unix software, according to Micom's Joseph Mannas, senior product manager for Unix System V products.

"You plug our NP600 protocol processor board into the 80386, load the TCP/IP protocols on and then you are on the Ethernet. Unix automatically knows how to talk to the board," d'Annunzio said.

Connection a first

Direct Unix connection to Ethernet was not possible before this time, said Bruce Kin Huie, industry analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

"This further integrates Unix processors into an Ethernet environment," he said. "They are giving the capability for direct connection, and the OEMs they sell to will bundle the product with existing processors, thereby making it readily accessible for end users to tie into Ethernet."

This will be transparent to the end user, who will not have to write customized code to connect to Ethernet as he would have had to before, Huie added.

Release 3 of Unix is the first truly networkable operating system because of the Streams capability, d'Annunzio noted.

Because the Micom controller supports the TCP/IP protocol, the Unix systems on the network can talk to other Unix systems and to non-Unix systems as well.

"For example, if there was a Digital Equipment Corp. VAX on the network running VMS and it supported the TCP/IP protocols, it would be possible for files to be transferred between the 80386 and the VMS system, because they both share the same protocols," d'Annunzio said.

"There are different ways of supporting TCP/IP," IDC's Huie said. Users will have to know which versions the company uses of TCP/IP, as all versions do not tie in together, he concluded.

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EDITORIAL

Data laissez-faire

The fact that the dirty politics of Irangate have played a role in the Reagan administration's backing off its data security policy is proof positive of the capriciousness and ill-conceived nature of that policy.

Moreover, this politically inspired flip-flopping is a scathing indictment of any administration's ability to set such national mandates without having to first consult with Congress or the private sector, despite the potentially profound effect of such policies.

To be fair, it should be noted that pressure from Congress and the private sector did have something to do with the administration's change of direction regarding the computer security policy.

But clearly it was the refusal of former National Security Advisor John ('Thou Shalt Take the Fifth') Poindexter to answer a congressional committee's questions about the computer policy that provoked the reversal. His lawyer said such answers might relate to Poindexter's role in the Iran arms-sale fiasco.

All this being said — or not said, in Poindexter's case — the question must be addressed as to just what role the federal government should play in setting such policies as access to U.S. data bases.

To be certain, the unilateral action attempted by the executive branch of the government under the guise of national security was terribly flawed. Categories of what the government considered highly sensitive data were far too broad.

It was reminiscent of the Reagan administration's attempt a few years ago to include the Apple II on the list of hardware banned for sale to the Soviet Union.

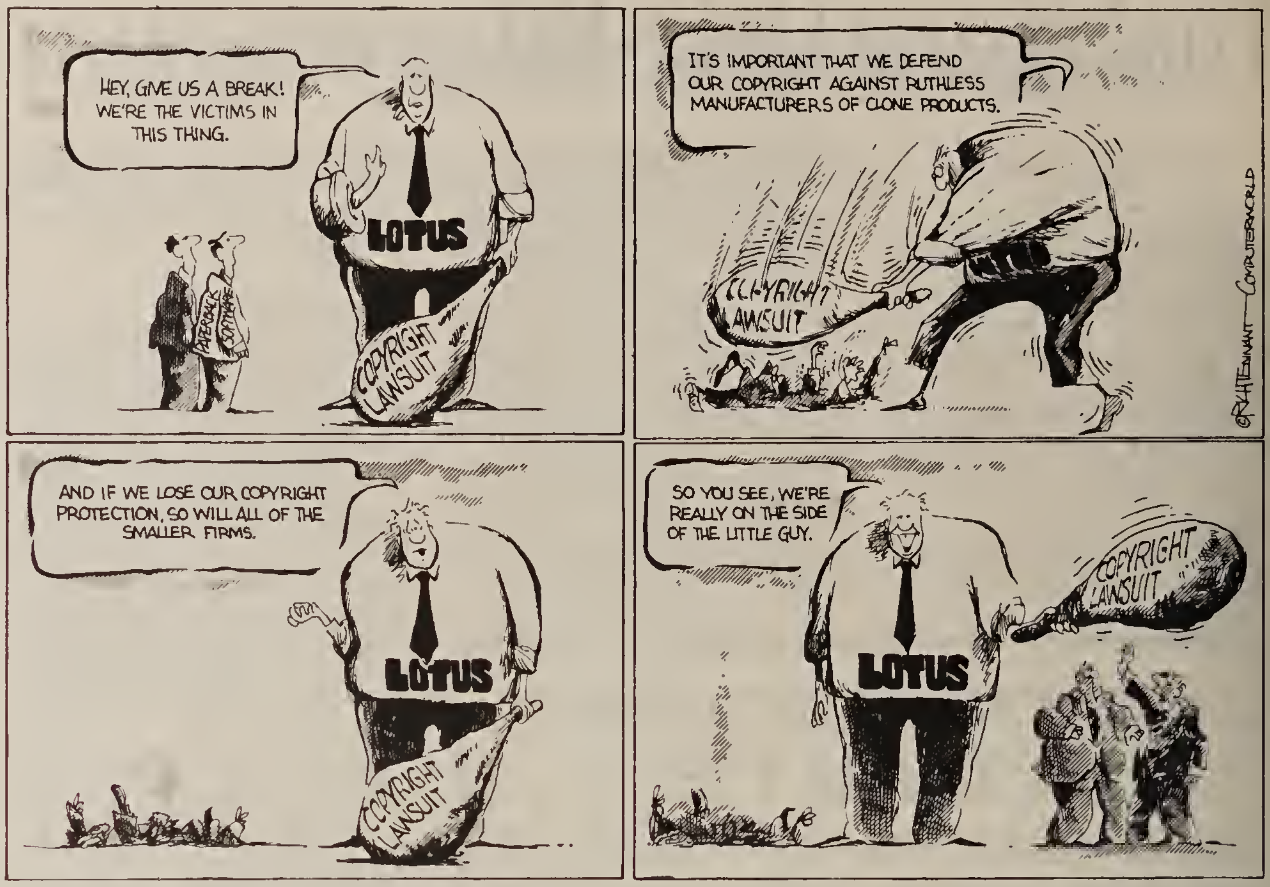
In both cases, input from the private sector could have shed much light on what should be rational exclusionary policies. But the only group the administration listened to was the military.

For this reason, it is encouraging to see the reduction of the role of the military in such policy setting, vis-a-vis the diminished role of the National Security Agency in shaping such policy.

FAR AND AWAY, we favor the approach to data security policies proposed by Rep. Jack Brooks (D-Texas). His proposed Computer Security Act would place considerable authority for developing and maintaining security standards in the nonmilitary sphere in the hands of the National Bureau of Standards.

The bill would also leave a considerable chunk of control in the hands of the military and the NSA — but control only of the computer and communications systems operated by the military and the intelligence agencies.

In other words, the administration that promised to keep government off the backs of the people should do exactly that and stop meddling in private-sector affairs, the sanctity of which the military can have such reckless disregard.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LETTERS TO THE EDITOR

CICS response time

In response to your "Netspy vs. Mazdamon" product face-off [CW, Feb. 2], there are several technical reasons CICS system programmers do not want to implement definite response in CICS (IBM recommends against it for large network shops). When definite response is turned on in CICS, it means that CICS will hold overhead resource until it receives a reply (from VTAM) that the control unit has actually received the outbound message.

Another issue involves the way CICS handles outputs for transactions. It is common for CICS to issue more than one output to a terminal per transaction; the second output is a null buffer used to change the flow of direction.

In this case, definite response in CICS means that the Change of Direction indicator or End of Bracket, which actually restores the keyboard, will not be sent until a response to the previous output is received back at CICS, which obviously means that the user's response time will suffer. Netspy's FORCEDR feature for CICS allows users to measure network response time without incurring any CICS overhead.

Two major network performance issues that are not discussed but which have been addressed by Netspy are the following:

First, since multiple session management products allow a user to interact with up to 16 different sessions at the same time, the ability to measure true end-to-end response time is destroyed. In early 1986, we started working with several of the major vendors of these products. As of October 1986, we have actually had a Netspy/Tele interface in production.

The second issue applies only to Netspy. Netspy's objective has been to bridge the void between raw data collection and an "expert" system.

As of September 1986, Netspy evaluates and reports on how applications design can adversely affect network performance. This adds a new dimension to the quality of information available to network personnel.

Peter J. McLaughlin
President
Chicago-Soft Ltd.
Chicago

This week in history

March 28, 1977
Judge David N. Edelstein upholds Itel Corp.'s charges that IBM attorneys harassed and intimidated the company to obtain documents for the *U.S.* v. *IBM* antitrust trial and denies an IBM motion requesting additional Itel documents "in light of the conduct of counsel for IBM." The Department of Justice eventually dropped the suit in 1982.

March 29, 1982
As nearly a million people watch and cheer, the space shuttle *Columbia* roars into orbit. Its third and longest space mission involves the heaviest use of computers and data processing to date. During the landing, the shuttle's astronauts will for the first time turn over command of the ship to the on-board computers.

No thanks to SQL

I agree with Barry Randall's letter to the editor, "Language factions" [CW, Feb. 9]. I have used Relational Technology, Inc.'s QUEL for three years and recently reviewed IBM's Structured Query Language because it is "the standard."

There are areas where QUEL is superior to SQL. Having been a Cobol programmer for 10 years, I am an advocate of good standards. I do not believe SQL is a good standard, but it is "the standard." Too bad the standard was set so quickly. As long as Relational Technology will support and enhance QUEL, I will be in no hurry to switch to SQL and make my job more difficult. Thanks, IBM, for the relational concept! No thanks for SQL!

Greg Collver
Manager/Programmer
Josephine County
School District
Grants Pass, Ore.

DDM, DBMS differ

The article, "DDM holds distributed DBMS key" [CW, Feb. 23], is inaccurate in its characterization of IBM's Distributed Data Management architecture as the basis for a distributed data base management system. There is a considerable difference between managing data and data base management. DDM is not a distributed DBMS. It is a way to distribute access to data. However, a distributed data base is a future consideration for the Distributed Data Management architecture.

Charles B. Holleran
Director
Communications Operations
IBM
Rye Brook, N.Y.

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3317-8713

AI, Mozart and the thermos

Solving expert system dilemmas with an 'Average Joe' system

ASHLEY GRAYSON

The word in the industry is that when a computer company gets in trouble and starts losing money, it claims to be in the artificial intelligence business.

This cynical observation may be correct, but why should the payback to artificial intelligence companies be so thin? Is it because AI is a great mirage that can be pursued but never caught, or that AI is the label for anything that is hard to do?

Serious AI researchers keep shooting themselves in the foot by redefining the term to refer to whatever doesn't work — yet. But simultaneously, they avoid areas in which they could succeed gloriously without much effort.

The problem is that so many smart people work in AI. They are the ones who are always looking for challenging things to do. Of course, only the most undeveloped areas will appeal to such researchers. What they are doing and why will have to be explained to us mortal folk, which increases the cost to companies attempting to market the results.

COGITO ERGO... HUH ?

BOB DAHM

Encoded wisdom

Consider expert systems. The goal here is to capture the wisdom of a highly skilled expert by encoding it in a computer program. The program can then advise a not-so expert on the critical topic, giving him the benefit of the expert's knowledge without the expert being present. Since most of the attempts have undertaken arcane subjects, success has been hard to achieve.

The reason seems twofold: First, not only is becoming an expert on a subject time-consuming and difficult, but knowledge of technical subjects rapidly becomes obsolete unless it is constantly updated. Semiconductor engineers, for example, can only learn useful skills on the job.

Second, an expert becomes a target for attack. The key in any legal trial is to discredit the other side's expert witness. The typical American response to a lofty opinion is, "Says *who*?" It is human nature to look for the exception that will invalidate the expert.

It's also expensive to hire an expert system. People accept entry-level jobs when they graduate from school and earn more as their experience grows on the job. A typical expert system asks for a starting salary equivalent to almost a half million dollars a year because it knows a lot about a special topic. How long would a human expert have to search for a position with such a pay package?

I propose two solutions to the Expert System Dilemma. First, to get the cost down, let's produce the Average Joe System. Average Joe isn't an "expert," but he's cheap and eager. Consider the counter person at the burger chain. This individual doesn't know everything about the hamburger industry, but he or she can take your order and make change and maybe even smile. Average Joe will be the computer equivalent.

What should Average Joe know? A small story will explain: Three construction workers sat down to lunch on the steel girders of a skyscraper they were building. They started talking about the world's greatest inventions. The first said he thought the light bulb was the greatest invention. "Without the light bulb, we couldn't do any work at night except by candlelight, and can you imagine trying to find the way home without streetlights?"

The second disagreed. "No, it's the wheel. Without the wheel, we couldn't have wheelbarrows or backhoes or cars or trains or anything! Day or night, we'd have to walk!" he said.

"No, no," the third countered, "It's the thermos bottle."

"The thermos bottle!" cried the other two. "What's that got to do with it?"

"Well," replied the third, "it's artificially intelligent. It keeps your coffee hot and your lemonade cold. How do it know?"

Like the thermos bottle, Average Joe should be operable by anyone who can pour coffee and should do what is appropriate to the situation. It will be easy to hire, work cheaply (for awhile) and learn on the job — and perhaps even smile.

Dialogue extraction

My second solution to the Expert System Dilemma is to recreate experts who are no longer available to us. The latest developments in AI indicate that while it is difficult for an expert to describe how he reasons, inference programs can deduce his methods, given sufficient examples. The inference program then develops the expert system program, bypassing the interview techniques used in dialogue extraction.

Surely we have enough works of Mozart to test the inference theory. Mozartian composition obeys certain rules. His creativity was tested in how he applied or broke the rules. If an inference approach can compose mock Mozart that is as pleasant to listen to as the original, we have a program that can earn royalties.

Likewise, we can draw on extensive writings of Jefferson and Lincoln to develop a potentially valuable presidential adviser. I'd give an extra buck in my income taxes if I thought such an expert system could provide Thomas Jefferson's insight to the president. Wouldn't you?

Grayson is the founder of ADG, a San Pedro, Calif.-based organization that develops sales tools and programs for high-technology companies. Having spent 11 years marketing large systems for Digital Equipment Corp., he now works extensively with IBM-compatible micros.

Debunking the myth of relational systems

C. J. DATE

The relational performance myth has finally been exposed for what it is — a myth. A genuine relational data base management system (DBMS) has finally demonstrated transaction rates equal to or better than the rates of the fastest nonrelational DBMS — rates in the hundreds or even thousands of transactions per second.

Benchmark tests of the new Tandem Computers, Inc. Nonstop SQL DBMS, conducted by Tandem and audited by the Codd and Date Consulting Group under contract to Tandem, measured transaction rates of more than 200 transactions per second. This figure easily puts Tandem's Nonstop SQL in the same league as typical high-performance nonrelational systems such as IBM's IMS Fast Path.

Furthermore, the Tandem transactions were conventional application programs, written in a mixture of Cobol and SQL — no special coding tricks were used, no SQL function was sacrificed and no low-level assembler language programming was necessary. The 200 transactions per second were achieved on a normal Tandem configuration. That figure should scale up to more than 1,000 on a larger system, with a theoretical limit of many thousands on the maximum possible configuration.

The transaction used for the benchmarks was the well-known debit/credit transaction, the de facto standard. Debit/credit is derived from the banking industry and is widely accepted as a typical transaction. In other words, the results are not measurements of an artificially simplified or tailored work load.

Why are these results so significant? The answer is simple: The last barrier to the acceptance of relational DBMSs in the commercial world has finally been removed. Relational data base now must be the technology of choice for all application areas — not only those in which it has traditionally been strong, such as ad hoc query, but now also performance-critical areas, such as on-line banking, in which performance requirements have previously been prohibitive.

The relational model was originally proposed in 1969 by E. F. Codd. During the 1970s, there was dramatic progress in the research world; many prototype relational systems were built, and many fundamental data base problems were solved.

By 1980, the first relational products appeared. However, most of those early products concentrated on end-user facilities, such as ad hoc queries. While the advantages of relational systems — usability, flexibility, data independence, productivity, ease of prototyping and so on — were widely recognized and accepted, the fact is that relational systems did not at that time provide the kind of performance needed for high-volume production applications. And some people claimed they never would. Here are typical remarks:

- "Practically speaking, relational systems can handle far less data and far less processing than operational systems." (William Inmon, CW, Oct. 1983.)
- ". . . relational is inherently slow." (Frank Sweet, *Datamation*, July 1984.)
- ". . . [nonrelational] and relational DBMSs are working toward different [and irreconcilable] design objectives — performance vs. ease of ad hoc use." (Hugh Ryan, CW, Sept. 1984.)
- "Relational data bases are powerful and flexible but are slow performers." (Bao Nguyen, CW, Sept. 1985.)

The truth is that there is absolutely nothing in the relational model that precludes excellent performance. However, it is also true that to achieve good performance requires skilled and careful work on the part of the DBMS designers and implementers.

By contrast, to achieve good performance in a nonrelational system requires skilled and careful work by DBMS users (data base administrators and application programmers). This fact explains why nonrelational systems require such a high investment in trained personnel to use and maintain them.

Now, people knowledgeable in relational technology have known these facts for years; the arguments that relational systems could never perform were always basically nonsense. But the truth did need to be demonstrated in a realistic environment; in other words, someone needed to show that a practical, commercial, relational DBMS could actually achieve production-level transaction rates on genuine, realistic applications.

Now, at last, someone has. The relational performance myth is finally debunked once and for all. It is a milestone in data base history.

Date is an independent author, lecturer and consultant specializing in relational data base technology. He is co-founder, with E. F. Codd, of The Relational Institute and the Codd and Date Consulting Group, both located in San Jose, Calif.

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Howard Fosdick

ISPF key in convergence

While the world criticizes IBM for the incompatibility of its mainframe operating systems, the company has been quietly following a strategy of operating systems convergence.

Since 1979, IBM has nurtured a shell program for its key operating systems. This shell surrounds those operating systems, making them appear the same to programmers and end users. Programmer and user skills, as well as program source code, become transferable across operating systems.

This IBM shell is composed of two program products: the Interactive System Productivity Facility (ISPF) and the ISPF/Program Development Facility (ISPF/PDF). ISPF supplies a runtime environment for interactive applications. It also contains callable services used in the development of those applications. These ISPF services handle full-screen I/O, data management, batch-job submission, library access and control and other functions.

ISPF/PDF is an ISPF appli-

Continued on page 28

All-In-1 spurs DEC success

BY NINAMARY BUBA MAGINNIS
CW STAFF

Digital Equipment Corp.'s office automation package, All-In-1, enjoyed its biggest year ever in 1986, which observers said is helping the company sell computers.

DEC shipped 1,173 All-In-1 licenses last year, bringing the U.S. installed base to 3,254, according to Heidi Gabrielson, a researcher for Framingham, Mass.-based International Data Corp (IDC).

Since its debut in 1982, the integrated office automation package has become increasingly popular. By 1983, All-In-1 was installed at 645 sites, Gabrielson said. An IDC survey shows the firm shipped 641 licenses in 1984 and 795 in 1985, she added.

DEC's office package includes electronic mail, word processing, a time manager calendar, a desk manager that gives users an on-line what-to-do list, an on-screen calculator and a filing system. Optional features include Decalc, a spreadsheet application; business graphics; Decslide, a tool for creating overhead slides; and a series of data-query and manipulation tools, including DEC's Datatrieve, Teamdata and Rally.

The software runs on the DEC VAX hardware line, ranging in price from $6750 for the Microvax 2000, with a limit of four users, to $106,880 for the high-end mainframe 8978 Vaxcluster that can handle hundreds of users.

All-In-1 faces tough competition from Wang Laboratories, Inc.'s Wang Office, IBM's Professional Office System , Data General Corp.'s Comprehensive Electronic Office and Hewlett-Packard Co.'s Personal Productivity Center, according to IDC's Gabrielson.

Initially, All-In-1's integrated packaging gave DEC an edge in the office automation market,

Continued on page 27

Vollie ties development between IBM systems

BY CHARLES BABCOCK
CW STAFF

Applied Data Research, Inc. (ADR) has announced a release of ADR/Vollie, its on-line development system that allows programmers to share program development across IBM VM and VSE operating systems.

Vollie Release 4.0 duplicates the screens and commands previously reserved to VSE users in the VM/Conversational Monitor System (CMS). The environment is simulated in CMS, with actual execution being transferred to the VSE Vollie system. Results are then passed back to the CMS programmer, according to Greg Walsh, Vollie product mangager.

Programmers want to go back and forth between VSE and CMS because in many smaller mainframe shops, VSE serves as the production system and VM/CMS as the development system. An estimated 18% of all mainframe sites use this dual operating system approach, Walsh said.

Vollie performs its cross-system services where VSE is running as a guest under VM. Many of the shops that use the dual-system approach are eventually planning on migrating to VM and are maintaining applications in both environments, Walsh noted.

Release 4.0 allows programmers to switch back and forth between VSE and CMS for test executions of their programs or to shift test data from one operating system to the other, Walsh said.

For example, a production program can be transferred from Vollie's on-line library in VSE to the CMS equivalent, a VM minidisk, Walsh said. From there, it can undergo modification or development in the CMS environment and then be sent back to the Vollie library.

ADR officials said a Vollie user may wish to drop into CMS to test or execute a program. When he transfers back, he returns to the point where he was working in Vollie. "It's like a

Continued on page 32

PC-based 4GL added to tool

BY ALAN ALPER
CW STAFF

EDISON, N.J. — Multisoft, Inc. has brought out a release of its Super-Link development tool for building peer-to-peer applications within IBM environments.

Super-Link features a personal computer-based fourth-generation language, a background communications facility (BCF) and connectivity to Digital Equipment Corp. VAX computers running VMS.

Super-Link can be used to build cooperative peer-to-peer applications under CICS, TSO, VM/CMS and IDMS/R-DC in IBM environments, or under RDB on VAX hosts running the VMS operating system, Multisoft said.

"While this is Version 3 of the product, it is the first version to run in the VAX environment," noted Donald Wszolek, vice-president of marketing and sales.

The 4GL offered with Super-

Continued on page 28

Inside

- DTSS introduces an integrated micro and mainframe software distribution system. Page 30.
- Context adds to its series of Documentation Workstations. Page 32.

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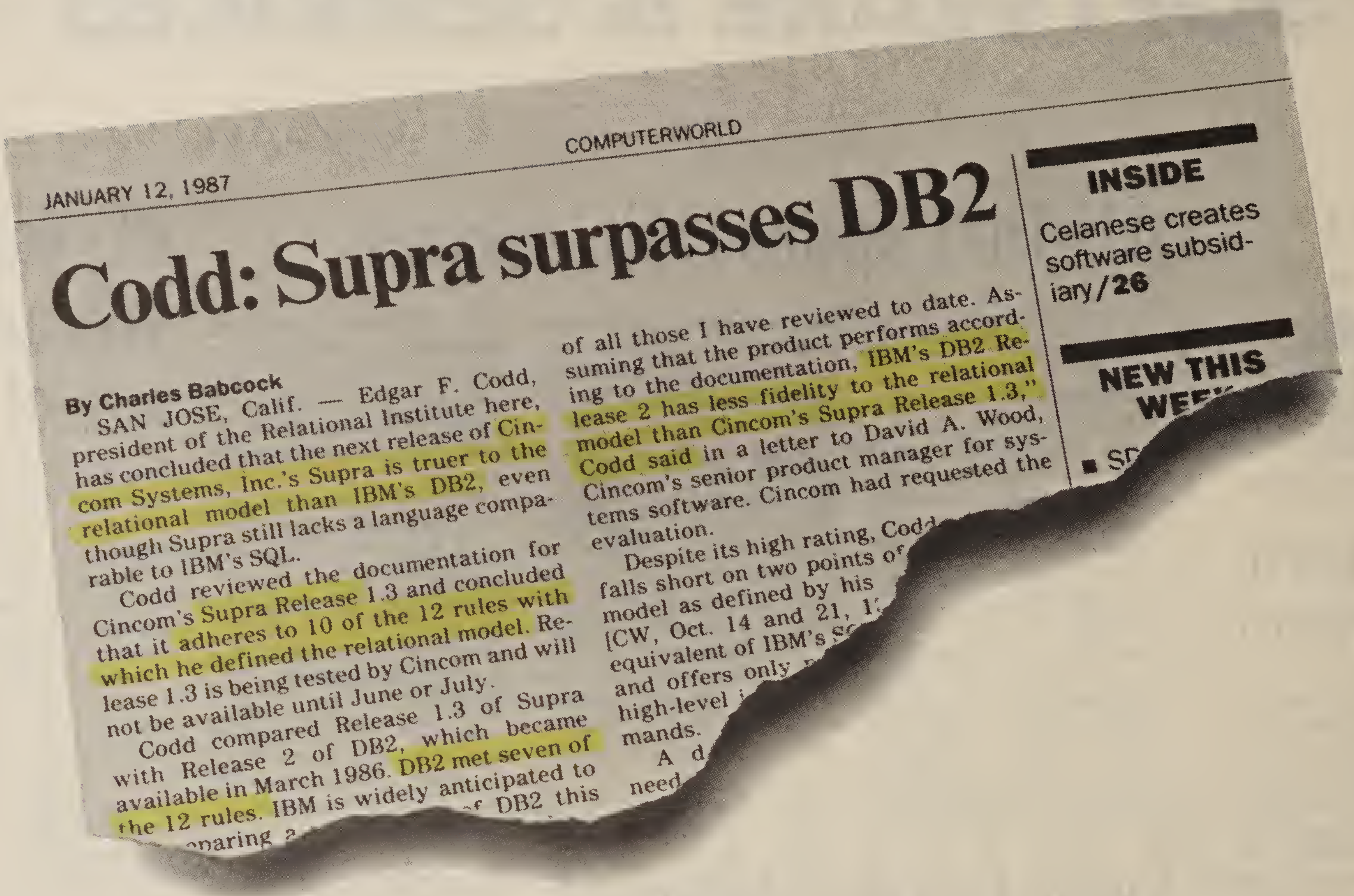

JANUARY 12, 1987

COMPUTERWORLD

Codd: Supra surpasses DB2

By Charles Babcock

SAN JOSE, Calif. — Edgar F. Codd, president of the Relational Institute here, has concluded that the next release of Cincom Systems, Inc.'s Supra is truer to the relational model than IBM's DB2, even though Supra still lacks a language comparable to IBM's SQL.

Codd reviewed the documentation for Cincom's Supra Release 1.3 and concluded that it adheres to 10 of the 12 rules with which he defined the relational model. Release 1.3 is being tested by Cincom and will not be available until June or July.

Codd compared Release 1.3 of Supra with Release 2 of DB2, which became available in March 1986. DB2 met seven of the 12 rules. IBM is widely anticipated to
DB2 this
paring a

of all those I have reviewed to date. Assuming that the product performs according to the documentation, IBM's DB2 Release 2 has less fidelity to the relational model than Cincom's Supra Release 1.3," Codd said in a letter to David A. Wood, Cincom's senior product manager for systems software. Cincom had requested the evaluation.

Despite its high rating, Codd
falls short on two points o
model as defined by his
[CW, Oct. 14 and 21, 1
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INSIDE

Celanese creates software subsidiary/**26**

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Sharon B. Weinberg, President of Codd & Date Consulting Group and a former relational database consultant with IBM® responsible for releases of DB2, will review Dr. Codd's point-by-point comparison of SUPRA Release 1.3 and Release 2 of DB2. She'll demonstrate why Dr. Codd concluded that SUPRA adheres to 10 of his 12 basic rules for the relational model, versus DB2's 7 of 12, and explain why he stated, "SUPRA's rating is the highest achieved of all those I have reviewed to date."

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All-In-1

CONTINUED FROM PAGE 25

according to Marty Gruhn, market research vice-president for The Sierra Group in Tempe, Ariz. "Today, All-In-1 is probably not as different as it used to be. If I was a user, I would have to look at what functions are most important to me," Gruhn observed.

DEC word processing is not considered as friendly or powerful as Wang's, Gruhn said. "DEC's electronic-mail and networking functions are a tad better than some others," which is one reason DEC emphasizes its networking, Gruhn added.

Others will catch up

In time, other vendors will catch up with DEC in networking and architecture, said Judith R. Davis, associate editor for Boston, Mass.-based Patricia Seybold's Office Computing Group. "DEC needs to make sure it pays attention to functionality in the future, because it may come down to that," Davis said.

DG's Comprehensive Electronic Office uses an integrated filing system that includes spreadsheet filing. With All-In-1, users can only file word processing documents and mail messages. "Once you get away from that, the user is back in the more complex DEC Record Management System," she added.

"At the time All-In-1 was announced, it was an excellent product," Davis observed. "DEC is on such a roll right now. A lot of people are finding DEC's hardware and networking strategy is what they need. And what comes along with that is All-In-1."

All-In-1 was instrumental in the decision by Corroon & Black Corp., a New York insurance brokerage firm, to retain DEC hardware, said Valerie Hanna, the firm's office automation director.

Corroon & Black depends on the software's electronic-mail system for remote communications. The firm's financial department, for example, electronically publishes quarterly results as soon as they become available.

Before installing All-In-1, Corroon & Black relied on overnight courier and facsimile to disperse timely information. "All-In-1 is quicker, more confidential and allows us to use data bases," Hanna said.

Libbey-Owens-Ford Co., a Toledo, Ohio-based glass manufacturer, is an IBM shop that disperses VAX systems throughout the company to run local applications, according to MIS director David Fryer.

Slow during peak hours

With more than 600 All-In-1 users, the office tool performs slowly during peak hours. "It's resource consumptive. It uses VAXs up quickly," Fryer observed. "But then again, it's very easy to use machines up because everyone is so enthusiastic to use the system. It's difficult to say no to users. We keep just adding on more, one more, one more. If it's a performance problem, we bring it on ourselves."

A proper All-In-1 configuration considers many factors, including users, memory size and disk capacity, said Claire Messier, DEC's All-In-1 product manager, explaining that some users do not configure systems according to recommendations.

Wang Office and HP office solutions are generally faster during peak periods than DEC's All-In-1, according to John McCarthy, research manager at Cambridge, Mass.-based Forrester Research, Inc. "Particularly in Wang's case, where you can off-load word processing to terminals," he said.

Libbey-Owens-Ford's Fryer admitted performance is definitely a hardware bottleneck. "DEC would rather see people spend money on more million instructions per second for outstanding service," he said.

Saves money

Yet All-In-1 has served the glass maker well since its installation in 1983. "I think the product has probably saved us a lot of money over time," Fryer observed.

Edward D. Jones Co., a St. Louis-based brokerage firm, evaluated All-In-1 last year and plans to purchase it for 1,100 branch offices, said Rich Malone, general partner responsible for data processing.

"We're asking DEC for enhancements to give us standard functionality," Malone said. With calendaring, for example, Malone said his secretary cannot view his time to schedule meetings.

The All-In-1 spreadsheet does not follow the industry standard, Lotus Development Corp.'s 1-2-3, he added. "Moving information from one field or cell to another isn't as easy to do with DEC's spreadsheet as it is with Lotus," Malone explained.

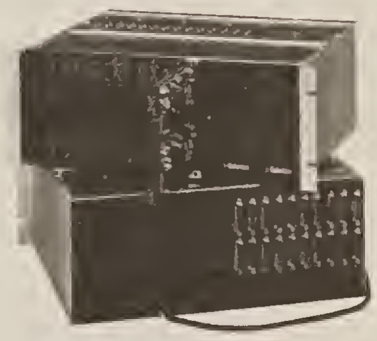
DEC's All-In-1 training is superficial, at best, Corroon & Black's Hanna said. "It's a layered product, with layers of mystery. There's a lot more you can do with All-In-1, and I find out more and more when I attend user groups," she said. "We want to do sophisticated things quickly, and the training doesn't allow us to do that."

Access not easy

Corroon & Black users cannot always access departmental information easily.

"We'd like access without getting involved with electronic mail. We can access departmental data, but it's not as smooth or clean as we would like it to be," Hanna observed.

Still, All-In-1 remains a viable office solution. "Realistically, to the MIS person, it's the best system out there. It uses resources more economically," Hanna said.



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4GL

FROM PAGE 25

Link Version 3.0 — Cooperative Processing Language/I — allows users to create PC/Host peer-to-peer applications by providing language statements that can request host computer services, such as initiating transactions and performing data base I/O, Multisoft officials said.

The new BCF is said to enable PC applications written in C, Pascal and assembler to initiate and monitor background transactions on the IBM or DEC host, which a foreground PC application continues to process simultaneously. The background tasks can be CICS record-oriented transactions or more sophisticated data extraction and transfer functions, the firm noted.

Other features include autolink, a scripting facility for automatic dialup and logon sequences; dynamic path; forms library; and array processing.

Benefits of the release include up to 80% reduced host computer consumption and up to an 80% faster response time as well as reduced communications traffic, while using existing Systems Network Architecture/Synchronous Data Link Control bisynchronous and asynchronous communications, the firm said.

Super-Link's base price is $48,000 and includes file transfer, software distribution and peer-to-peer communications. The new BCF and CPL/I options should be available in April and are priced at $10,000 each for IBM mainframe host environments. VAX host prices range from $12,000 for the Microvax II to $42,000 for the VAX 8800.

Five customers currently use Super-Link, Multisoft's Wszolek said. They are The Dun & Bradstreet Corp., The Hertz Corp., Compass Computer Services Corp., Hilton Hotels Corp. and Intercontinental Hotels Corp.

"During the last year when we released Versions 1 and 2, the product was in a quiet embryonic stage. We were working with customers trying to flesh out the product and enhance the tools and facilities to cover a wide variety of TP monitors," Wszolek said.

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ISPF

FROM PAGE 25

cation designed to help programmers in the design and development of their ISPF programs. ISPF/PDF contains extensive on-line debugging facilities and offers a generalized, full-screen interface to operating system services.

Together, ISPF and ISPF/PDF surround the operating system, giving it a new software personality. For example, a programmer developing a Cobol program under IBM's MVS/TSO with ISPF or ISPF/PDF does not need to know anything more than he does to develop the same program under IBM's VM/CMS. ISPF/PDF gives the programmer the same development environment under both systems, while ISPF supplies the same callable program services.

ISPF renders the code largely portable across systems. The common ISPF runtime environment means that the finished application looks about the same to end users under either operating system.

Comparable to CICS

ISPF and ISPF/PDF compose a complete environment for the development and execution of on-line applications. The system is comparable to CICS and IMS DB/DC — but the difference is that ISPF and ISPF/PDF play a very different role in IBM's strategies.

IBM promotes CICS and IMS DB/DC as its transaction-oriented systems, optimized for volume updating. ISPF and ISPF/PDF play the key role in IBM's operating systems convergence strategy. As the linchpin of this strategy, ISPF and ISPF/PDF run under MVS/TSO, VM/CMS, DOS/VSE/ICCF and their variants, such as VM/IS, VM/E, VM/PC and SSX/VSE.

IBM also extended the ISPF environment to the desktop in two forms: the EZ-VU product for the Personal Computer family and full ISPF running under VM/PC on the PC AT Model 370. The result is that IBM offers ISPF, rather than CICS or IMS, for the programmer workstation.

High connectivity

In addition to their wide cross-systems availability, ISPF and ISPF/PDF feature high inter-product connectivity. ISPF and ISPF/PDF interface to IBM's interactive monitors (TSO, CMS, ICCF), all compiled programming languages, all command-procedure languages (C List, Exec2, Rexx) and all full-screen terminals. ISPF and ISPF/PDF run on all models of IBM mainframes and the PC family. Without the industry fully recognizing it, ISPF and ISPF/PDF have matured into a complete environment for applications development and execution. In this sense, ISPF and ISPF/PDF are fully comparable to CICS and IMS and DB/DC.

Moreover, IBM has cleverly repositioned ISPF and ISPF/PDF to address the major defect in the company's product line — IBM's diversity of operating systems.

Howard Fosdick is a widely published industry analyst. His book *IBM's ISPF: Under MVS, VM and VSE* is available from Van Nostrand Reinhold in Florence, Ky.

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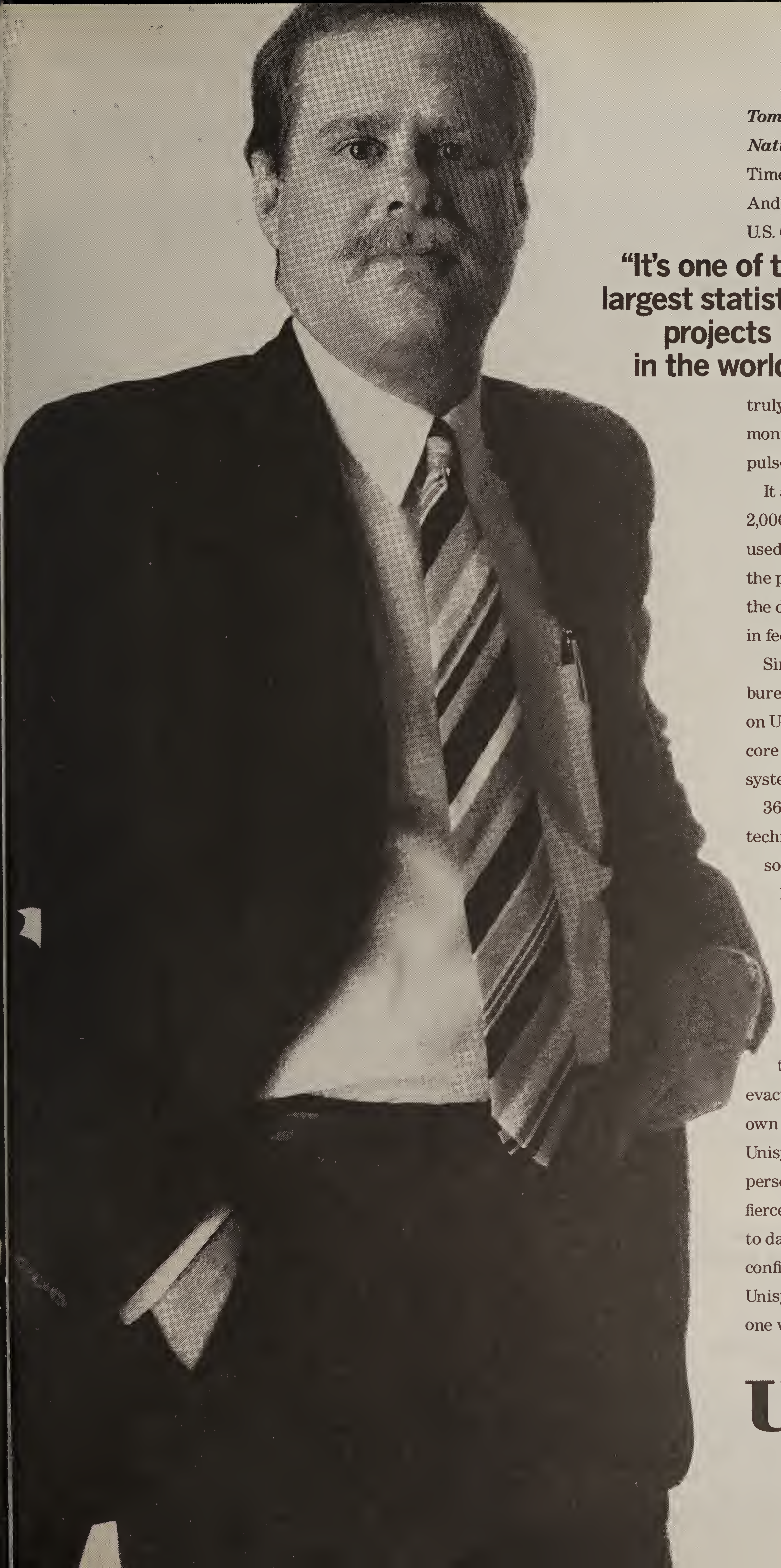

Tom Wilson,
National Account Manager, Unisys

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Systems software

DTSS, Inc. has announced **Sofstore**, an integrated micro and mainframe software distribution system.

The electronic system is said to incorporate host and personal computer systems software along with Datapass, the vendor's micro-to-mainframe link that permits both asynchronous and synchronous communications.

The Sofstore system offers report writing features as well as the ability to automatically announce software updates and deliver them to the users.

The initial release of Sofstore runs under IBM VM/CMS host computers utilizing the SQL/DS data base. The microcomputer portion requires an IBM Personal Computer or compatible.

Sofstore costs $75,000.

DTSS, Box 70, Buck Road, Hanover, N.H. 03755.

Softool Corp. has announced **Release 3.0** of its **Change and Configuration Control** environment specifically for Digital Equipment Corp.'s VAX computers running the VMS operating system.

According to the vendor, all components of a given product can be organized, managed and tracked as a unit with the release. Release 3.0 provides support for multiple module levels, the ability to automatically apply changes from one configuration to another, data base and journal file-integrity checkers, an enhanced build facility, a programmable interface to Change and Configuration Control and the ability to communicate between Release 3.0 and the data base across a network.

The cost of Release 3.0 on the DEC VAX/VMS systems ranges from $10,000 to $30,000.

Softool, 340 S. Kellogg Ave., Goleta, Calif. 93117.

Silicon Compilers, Inc. has announced five systems for its family of **Genesil** silicon compilation products.

The systems include the Genesil Macrocompiler, Genesil Mentor Series, Genesil Server, Genesil Logicdesigner and Genesil Chipbuilder. The products are said to provide designers access to silicon compilation and allow them to tailor silicon compilation to their design needs.

The Macrocompiler costs $75,000. The Mentor Series costs $159,500. The Genesil Server costs $450 per node. The Logicdesigner costs $79,500, and the Chipbuilder costs $119,000 on the Digital Equipment Corp. Microvax II and $295 on the VAX 8650.

Silicon Compilers, 2045 Hamilton Ave., San Jose, Calif. 95125.

Prime Computer, Inc. has introduced **Prime Medusa/PC** software, a two-dimensional version of its Prime Medusa mechanical computer-aided design software system that can be used on an IBM Personal Computer AT operating within a Prime 50 Series minicomputer environment.

Prime Medusa/PC is said to be compatible on the data base level with Prime Medusa on a 50 Series system. It includes variational geometry and super syntax, a graphics programming language.

Other features include a simplified menu and a sketcher.

Prime Medusa/PC is available to Prime Medusa customers.

It costs $5,000 per license with a monthly maintenance fee of $65.

Prime Computer, Prime Park, Natick, Mass. 01760.

Applications packages

Britz Publishing, Inc. has announced **Release 5.5** of **Bword**, a word processing package for IBM System/34 and 36 computers.

Release 5.5 offers users a choice of a full-screen editor or a source-entry utility. Other features include support for bold print and underlining, centering, single or double spacing, justified and nonjustified text within the same document and a dictionary with more than 31,000 words. The print option allows legal- or standard-length documents.

Bword is priced at $99.

Britz Publishing, 1814 Capital Towers, Jackson, Miss. 39201.

McDonnell Douglas Computer Systems Co. has introduced the **Advanced Distribution System**, a distribution package to run on its line of relational data base management business computer systems.

The product is said to manage a large inventory, track receivables, analyze sales and costs and control cash disbursements. It provides information on products, customers, financials and inventory through on-line inquiry and reports. It contains 14 interactive modules, including cashier and point-of-sale merchandising.

The Advanced Distribution System operates on the McDonnell Douglas M6000 and M9200 series of minicomputers. It is priced from $20,000 to $60,000.

McDonnell Douglas, 17481 Red Hill Ave., Irvine, Calif. 92714.

NBI, Inc. has enhanced the Time Accounting facilities of its **Lexpert** integrated software package for management of billing, accounting and administrative information in law firms.

Enhancements include expanded capabilities for tracking and maintaining client, firm and billing files, the addition of several user-defined data base fields and a billing remarks field. Also included is the option to print in the background while performing other functions in the foreground.

The Lexpert series runs on the vendor's 500 series minicomputers.

The Time Accounting software enhancements are priced at $21,500.

NBI, P.O. Box 9001, 3450 Mitchell Lane, Boulder, Colo. 80301.

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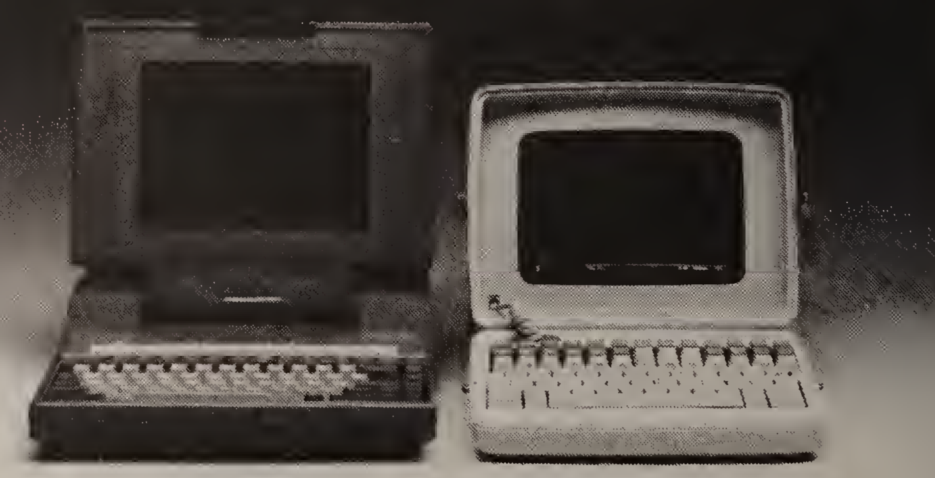

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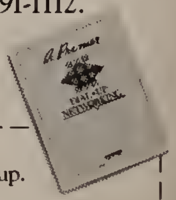

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Los Angeles	April 22	Kansas City	April 30	Denver	May 7	Hartford	May 14
Seattle	April 23	Boston	April 30	Cincinnati	May 7	Newport Beach	May 19
Vancouver	April 23	Houston	May 5	New Jersey	May 12	Ft. Lauderdale	May 19
Chicago	April 28	Detroit	May 5	St. Louis	May 12	Atlanta	May 20
Philadelphia	April 28	Dallas	May 6	Washington DC.	May 13	Raleigh	May 21
Minneapolis	April 29						

Interchart Software, Inc. has announced a reduction in the price of its mainframe organization-charting software package, **Interorg**.

Interorg is said to be a complete system for the preparation of presentation-quality organization charts. To produce the final chart it must be used in conjunction with Computer Associates International, Inc.'s Tell-A-Graf.

Interorg runs on IBM systems under VM/CMS and MVS/TSO and on Digital Equipment Corp. systems under Total Operating Systems 10 and 20 and on VAX systems under VMS.

Interorg costs $4,500 on IBM systems and $2,500 on VAX systems for a perpetual license.

Interchart, 104 Carnegie Center, Princeton, N.J. 08540.

Computer Associates International, Inc. has announced **Release 4.21** of its **Megacalc** spreadsheet software for IBM mainframes.

The product is said to allow file sharing with the Supercalc4 integrated spreadsheet for microcomputers.

Release 4.21 of Megacalc is said to allow users to transfer spreadsheet information including data, labels, formats, formulas and other parameters.

Other features include on-line mainframe data file-access to read data from Information Builders, Inc.'s Focus data bases and 34 advanced macro commands supporting conditional branching subroutines.

Megacalc Release 4.21 costs $7,800.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11430.

Lawson Associates has ported its **Pinstripe** applications software packages to the IBM DB2 data base environment.

The Pinstripe packages, which were designed to be integrated with DB2, include applications such as General Ledger, Accounts Payable, Purchase Order, Payroll, Human Resourcs and Fixed Assets.

Pinstripe Purchase Order is priced at $115,000, according to the vendor. Packages designed for SQL/DS are said to range in price from $105,000 to $120,000.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Context Corp. has added the **Engineering Writer** and **Engineering Writer Plus** documentation systems to its Context series of Documentation Workstations.

The Engineering Writer software features electronic-mail capabilities and shares the same version and data base management system with other Context products. It provides full what-you-see-is-what-you-get document editing with automatic page, section, figure and list numbering, table of contents generation and cross-reference resolution. Graphics and tables are included by reference.

The Engineering Writer Plus software offers the same capabilities as the Engineering Writer and Piced, the Context picture editor.

Engineering Writer costs $4,900 and Engineering Writer Plus costs $8,900.

Context, 8285 S.W. Nimbus Ave., Beaverton, Ore. 97005.

Frame Technology Corp. has released **Frame Maker 1.0**, a computer-aided publishing package for Sun Microsystems, Inc. workstations under the Sunview window system.

Frame Maker is said to integrate editing and drawing tools with an automatic document-design and layout system. Features include the ability to create original art, tables of contents, indexing, a programmable keyboard, freeze pagination, file locking, kerning, eight graphics anchoring options, ASCII input and output language and support for foreign languages.

Frame Maker software costs $2,500 per workstation.

Frame Technology, 2240 Lundy Ave., San Jose, Calif. 95131.

Vollie

CONTINUED FROM PAGE 25

bookmark," Walsh noted.

Since programmmers frequently develop VSE programs in the CMS environment, "it gives them a great deal of flexibility to be able to move data back and forth," Walsh said.

Unlike earlier versions, Release 4.0 allows the programmer to execute a VSE program in an interactive virtual partition established by Vollie, rather than being limited to VSE batch mode. The virtual partition functions like a time-sharing facility, allowing 28 Vollie users to execute a program concurrently, Walsh said.

A total of 512 CMS users and an unlimited number of VSE users may access the features of the Vollie installation.

Intelligent screens have been added to the release. They provide multiple functions on one screen or the option of executing one function against several members in the on-line library. In the past, a Vollie user was restricted to the one command he could type on a screen's command line acting on one member. Now he can delete all unwanted members, such as several collections of data, by executing a Delete command against all target members on the screen at the same time, ADR spokesmen said.

ADR/Vollie Release 4.0 is priced at $20,600 for a permanent license. Six-month, three-year and five-year leases are also available. The development system was introduced in 1978 and has an installed base of 2,300 licenses, Walsh said.

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© 198

Utilities

Empact Software, Inc. has announced **WTO/Manager**, a message management system for MVS automation.

WTO/Manager is said to manage all write-to-operator (WTO) and write-to-operator-with-reply (WTOR) messages. It reviews all messages sent to the operator console and can issue automatic commands that have been defined by an installation.

The user has control over which messages are selected for processing and the actions the software is to take. Capabilities are said to include automatic immediate or deferred commands to a WTO message, automatic replies to WTOR messages and automatic routing of urgent messages.

WTO/Manager is priced from $5,000.

Empact Software, 1275 Parker, Conyers, Ga. 30207.

Computervision Corp. has announced the **Personal Designer/CADDS 4X Direct Translator** designed to facilitate the translation of data bases between its personal computer-based computer-aided design and manufacturing (CAD/CAM) system, the Personal Designer and CADDS 4X, the CAD/CAM software residing on the vendor's premium workstations.

The product consists of two data base converter programs. One translator takes as input Personal Designer MicroCADDS Geometric Construction and Detailing, MicroCADDS Surfaces or Microdraft fields and creates a CADDS 4X file. The other does the opposite. The conversion in either direction is from one binary file to another.

The Personal Designer/CADDS 4X Direct Translator costs $1,200.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

The Dylakor Division of Sterling Software, Inc. has announced **Release 2.0** of its **Dyl-Interface IDMS/R** interface between Cullinet, Inc.'s IDMS/R data base and Dylakor's information management systems, Dyl-280 and Dyl-280 II.

The product is said to provide information retrieval, updating and report writing capabilities for IDMS/R users. Release 2.0 is said to have eliminated the requirement to use a subschema in a program when copying record and field descriptions from the IDMS Integrated Data Dictionary.

The product costs $8,690. A retrieval-only version costs $6,380.

Dylakor, P.O. Box 2210, 9340 Owensmouth Ave., Chatsworth, Calif. 91313.

Silden-Software, Inc. has announced **EZoff/36**, a utility designed to automatically monitor and sign off idle workstation terminals connected to the IBM System/36.

EZoff/36 automatically monitors all workstations on the system, signing off any CRT that has been idle for longer than a user-specified time limit.

EZoff/36 is priced at $475.

Silden-Software, 5007 Odessa Ave., Encino, Calif. 91436.

Boole & Babbage, Inc. has introduced **Resolve Plus** and the MVS Performance Manager.

Resolve Plus is an on-line multiple virtual system (MVS) performance tool said to aid in the detecting, diagnosing and solving of common system problems. The MVS Performance Manager provides integration for Resolve Plus as well as split-screen capabilities, interactive dialogues for defining and executing functions, session-output management with a journal facility and high-resolution color graphics.

Resolve Plus costs $19,000 for MVS/370 and $24,000 for MVS/XA.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Development tools

National Semiconductor Corp. has introduced an **optimized Fortran compiler** designed for use with the firm's Series 32000 family of 32-bit microprocessors.

The compiler is said to improve execution speed of Fortran code by more than 50% over the earlier release, while making the compiled code more compact by as much as 40%. In operation, the compiler converts syntax into an intermediate representation, optimizes the representation and converts the optimized code into compiled code. It separates the front end from the back end.

The optimized Fortran compiler is priced at $2,500 for the Digital Equipment Corp. VAX/VMS or VAX/Unix cross-compiler.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052.

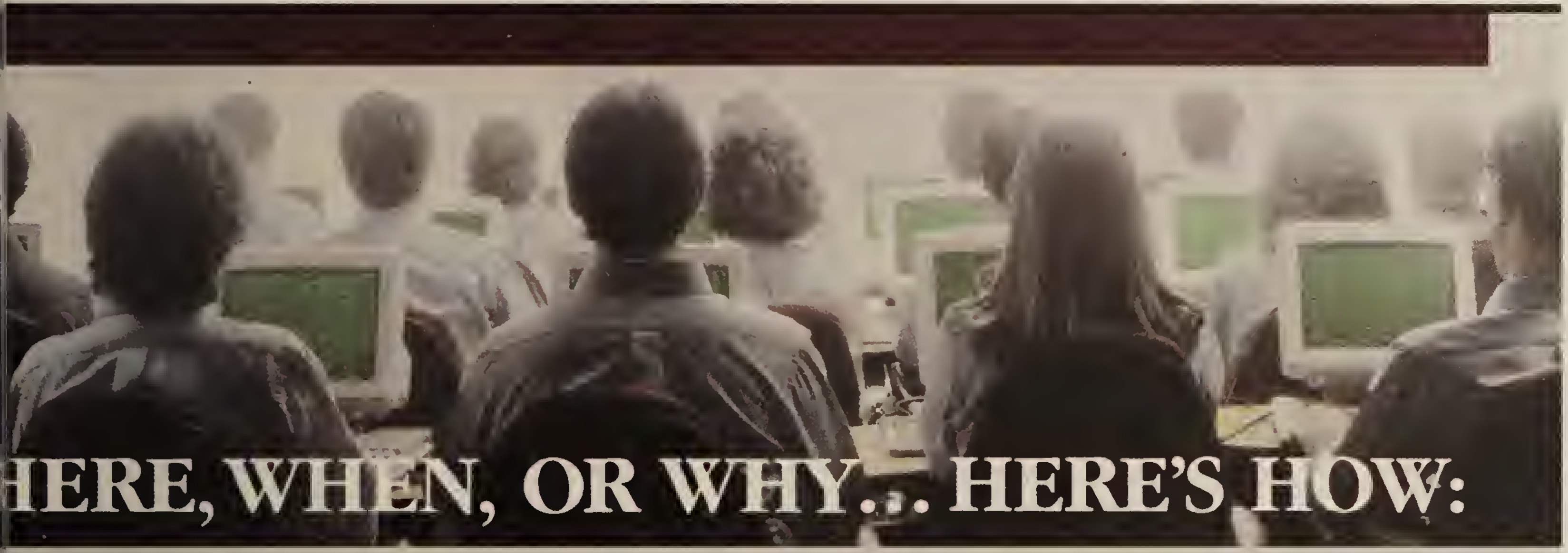
Rem Associates has announced **Release 5** of its **Remdoc** automated documentation package for IBM System/36 computers.

Features of Release 5 include the ability to analyze Cobol programs more extensively, print layouts, run book features, system flowcharts, file labels and name cross-references and display reports on-line with a character-string search facility.

According to the vendor, Release 5 also offers reduced disk space for RPG-based systems.

Remdoc is priced at $1,250.

Rem Associates, P.O. Box 527, Village Station, New York, N.Y. 10014.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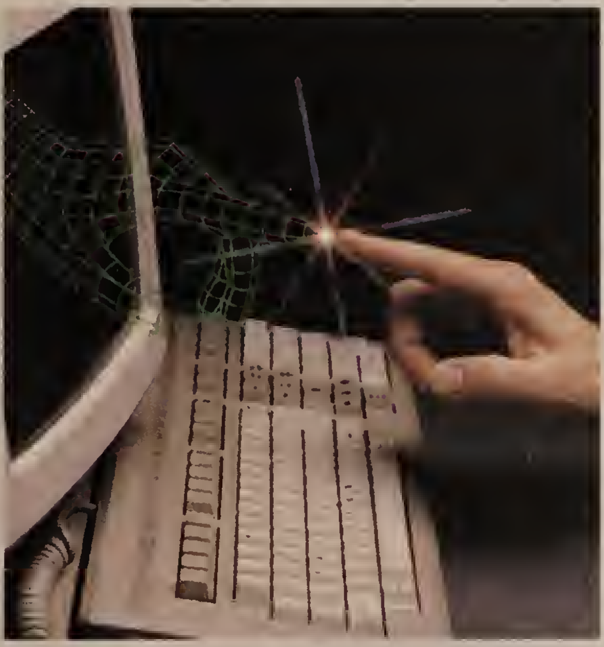

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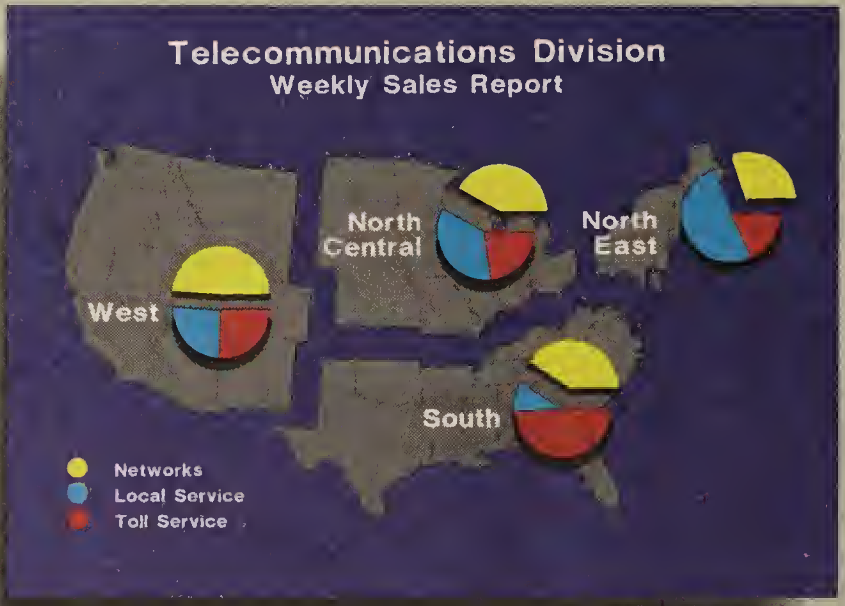

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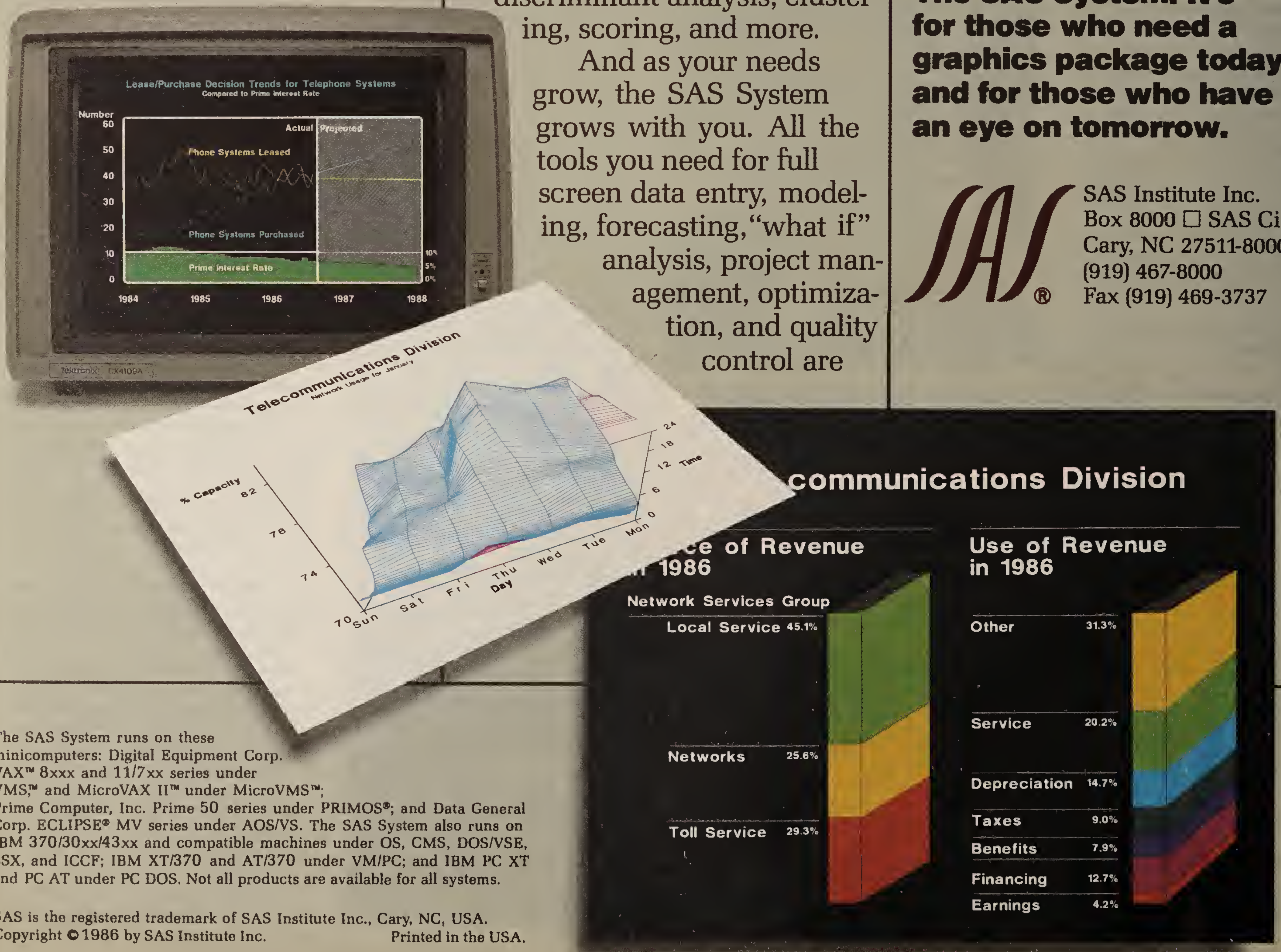

The SAS System runs on these minicomputers: Digital Equipment Corp. VAX™ 8xxx and 11/7xx series under VMS™ and MicroVAX II™ under MicroVMS™; Prime Computer, Inc. Prime 50 series under PRIMOS®; and Data General Corp. ECLIPSE® MV series under AOS/VS. The SAS System also runs on IBM 370/30xx/43xx and compatible machines under OS, CMS, DOS/VSE, SSX, and ICCF; IBM XT/370 and AT/370 under VM/PC; and IBM PC XT and PC AT under PC DOS. Not all products are available for all systems.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Relational reaches a boil

Relational data base management systems (DBMS) have composed an area of technology that is ready to start cooking, and much of the heat will come from basic concepts that were spelled out more than 10 years ago.

A key component is the Structured Query Language (SQL) syntax developed by IBM, which was first implemented in the late 1970s. My first acquaintance with SQL was at IBM's Cambridge, Mass., Scientific Center in 1978 and 1979 under VM/CMS.

Although the wait has been a long one, the bubbles in the pots of relational DBMSs and SQL are truly starting to appear. IBM's DB2- and SQL-based products from companies like Relational Technology, Inc. and Oracle Corp. are getting to be big news. Tandem Computers, Inc.'s recently announced SQL data base is yet another log on the fire.

Fox Research, Inc.'s 10-Base, a very usable DBMS for IBM Personal Computers and

Continued on page 38

Data search pokes at CD-ROM

Borland system reads data bases, includes specialty lexicons

BY PEGGY WATT
CW STAFF

SCOTTS VALLEY, Calif. — Borland International has developed a new technology for standard data search and retrieval that can be used with a variety of applications, including large data bases, on compact disk/read-only memory (CD-ROM).

The first application of Borland's Linguistic Technology reportedly will be included in Sprint: The Word Processor, which was recently announced by Borland and is scheduled to ship this spring.

Linguistic Technology's Thesaurus includes 300,000 synonyms and 30,000 root words. Borland said it plans to add specialty lexicons for vertical markets. CD-ROM tools and full text Search tools are scheduled to be available later in the year.

The technology has also been licensed as an OEM product by Turner Hall Publishing Co., a Cupertino, Calif., publisher of spreadsheet enhancement products.

Turner Hall will build the Borland technology into future products that interact with spreadsheets and need text search-and-retrieval tools, Tom Byers, general manager of Turner Hall, said.

"People who use Lotus Development Corp.'s 1-2-3 need a spelling checker, too," Byers said. He declined to describe the product further, but said it would not appear until the second half of this year.

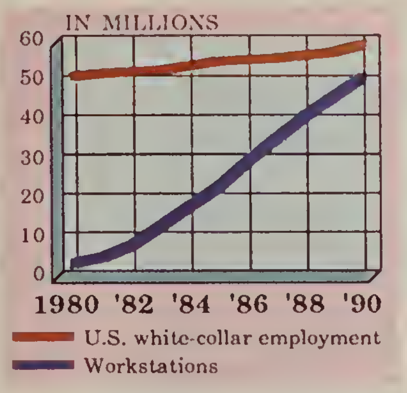
The Linguistic Technology concept is an outgrowth of Borland's Turbo Lightning information management package and will not be sold as a stand-alone product, according to the vendor.

Instead, the technology will always be built into an application, according to Spencer Layton, vice-president of business development for Borland. He called the technology an "operating system for words" that includes a synonym dictionary, spelling checker and automatic hyphenation and works in English and other languages.

Linguistic Technology is not intended strictly for CD-ROM; the product can also be applied to any mass storage that needs full text retrieval, Layton said.

Data View

U.S. white-collar employment vs. workstations
From 1980 to 1990



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Instaplan ships $100 PC project manager

BY DOUGLAS BARNEY
CW STAFF

MILL VALLEY, Calif. — Instaplan Corp. announced and shipped this month a $100 project management package for IBM Personal Computers and compatibles that was designed in the U.S. but developed in India.

The package, called Instaplan, sells for far less than many competing packages and integrates project management features with presentation graphics, a work assignment spreadsheet and outlining capability, the firm claimed. "There is nothing that is a complete system for that price," claimed Gary M. Cole, chief executive officer of Instaplan.

According to Cole, the package is the first major microcomputer application to come out of India, a country that has recently become known for its minicom-

Continued on page 36

Hand-held scanner inputs text

BY PEGGY WATT
CW STAFF

BEAVERTON, Ore. — Saba Technologies, Inc. is today slated to introduce Handscan, a mouse-like hand-held text scanner that can input printed text directly into many personal computer application programs.

The product is aimed at banks, auditors, authors and any office staffs that need to transfer data printouts into IBM Personal Computer applications, according to Robert Petkun, president and chief executive officer of Saba.

Like most scanners, Handscan provides an alternative to rekeying data. Handscan scans one line at a time. At the user's command, text can be edited as it is transferred.

Saba said the product's use is straightforward. The user slides the scanner across the line of text to be transferred, with a red hairline acting as a guide. Text is inserted into a spreadsheet grid, data base field or word processing file. The keyboard remains

Continued on page 40

Inside

- A micro played a part in the recapture of the America's Cup. Page 36.
- Toshiba unveils an LCD for the T1100 Plus. Page 41.

Betterbasic breaks away from a crowded pack

This is the first in a four-part series on Basic products for IBM Personal Computers and compatibles.

Best in Breed

BY T.A. ELKINS
SPECIAL TO CW

It may surprise naive users, those who have not spent much time on different systems, to learn that there are at least small variations between nearly every version of Basic. Even within interpreters and compilers written by Microsoft Corp., variations exist. As a result, the first criterion for judging a Basic programming language is compatibility with the millions of existing copies of GWBasic, which is bundled with Microsoft's MS-DOS, and Basica, which comes with IBM's PC-DOS.

My choice for best in breed among the tested Basics is Betterbasic from Summit Software Technology, Inc. in Norwood, Mass.

The first version of Betterbasic substituted a fair number of Summit Software's improved alternatives for standard GWBasic commands. This superficially innocent action, however, caused no end of troubles, because an important percentage of existing programs would not work with Betterbasic Version 1. The management of Summit Software learned from this experience, and Betterbasic Version 2 is about as compatible with the Microsoft standard as is reasonable.

Betterbasic is a genuinely modular language and uses this modularity in many ways, beginning with compatibility. For example, there are two modules bundled with the Betterbasic system just to provide GWBasic compatibility. The second module even allows a tokenized Basic program to be loaded directly into Betterbasic; as a first-rate refinement, the end user can load these and other specialized modules if and when required or omit them when they are not needed.

Other modules support the IBM environment with its function keys, its sound system and its DOS/BIOS interrupts.

There is a non-English module for foreign character sets and optional, though additionally priced, modules for automatic support of virtual memory support.

Makes the grade

The second criterion for judging a Basic programming language is power and flexibility. Betterbasic rates high in power — three to a dozen times the speed and many times the space of GWBasic — and earns high marks for flexibility. Betterbasic can use the entire 640K bytes of random-access memory space available with PC-DOS and MS-DOS. With the DOS Version 3 family and the optional virtual-memory module, it can use nearly unlimited space in expanded memory or on a hard-disk system without programmer intervention.

In addition, Betterbasic is an incrementally compiled system. The standard GWBasic interpreter is notable for its convenience in use, but interpreters are almost always slow to run. This problem results from the requirement, intrinsic in an interpreter, that every line of code be translated into machine language every time it is encountered, and most interpreters must search down through their code, starting with the first line, each time they encounter a GOTO statement.

Betterbasic compiles each line of code as it is entered. This action greatly improves a program's running speed and forces the system to check syntax as a

Continued on page 40

Portable helped clinch America's Cup

BY ALAN J. RYAN
CW STAFF

WESTBORO, Mass. — While patriotic Americans were cheering Dennis Connor and his *Stars and Stripes* crew to victory down under earlier this year, the U.S. America's Cup challenger had some added American support in the form of a portable personal computer.

Connor and his 10-man crew defeated Australia's *Kookaburra III* yacht 4-0 to bring the cup back to the states, and the Data General Corp. DG/One portable may have had a hand in that victory.

Systems analyst designer Dick McCurdy, speaking here recently, said the DG/One was selected for on-board use because "it was the only computer available that addressed all of our needs."

Those needs included graphics capabilities, the ability to display results on a screen that could be read in bright sunlight, enough power to handle data on wind and sea conditions and a package that would add little weight to the yacht.

McCurdy noted that although the DG/One met his criteria, one major concern was the unit's ability to survive. To ensure its life, he removed the screen and displayed it in the cockpit beneath a waterproof cover. The computer's body was placed under the deck in a watertight compartment. A special waterproof keyboard developed by McCurdy and his team allowed the crew members to call up information screens.

Storage, transmission

The portable was connected to a handheld range finder aimed at the competing boat to determine relative position between the boats. It stored all race data on local disks and transmitted instrumentation data to another DG/One on the nearby tender boat via a telemetry link for post-race plotting and analysis.

Additionally, the unit was connected to other instruments and sensors that indicated wind speed and direction and was connected to a radio navigation system that located the boat's position within one meter.

On the screen, seven different graphics applications could be displayed and would automatically change whenever a reading was taken, McCurdy explained. A course view was provided.

McCurdy, vice-president of Ockam Instruments, Inc., pointed out that computers have been in use in America's Cup yachting since the mid-70s, and he predicted that with the use of portable micros, the trend will grow.

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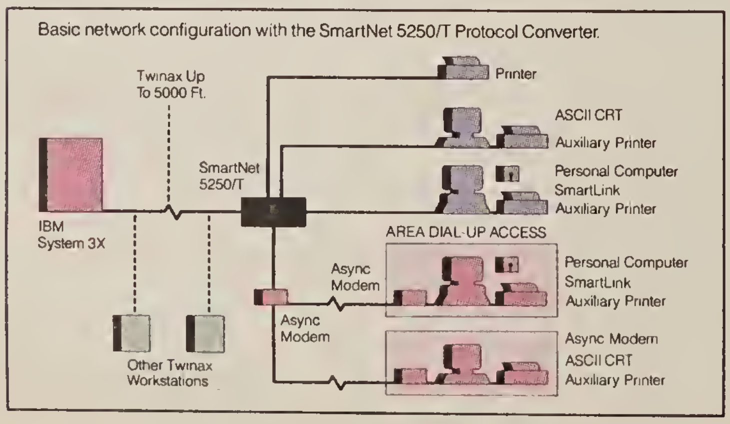
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Instaplan

CONTINUED FROM PAGE 35

puter software development.

Instaplan will introduce more products in the management area based on its royalty-based development agreement with the Indian firm of Wipro Systems Ltd., Cole said, but he declined to be more specific.

The firm claimed that several firms have been beta-testing the product, including General Electric Co., San Diego Gas & Electric Co. and Westinghouse Electric Corp. Site licenses are available, and the product is available direct from Instaplan with a 30-day money-back guarantee.

Neophytes targeted

The package is aimed at users who have not taken advantage of project management software, the firm said. "Full-time project managers like it as a tool to get others into the discipline of project management," Cole said. The target market, however, is "people who have never used automated planning tools," Cole added.

In addition to the package's low price, the firm said it aims to compete on the basis of technology and pointed to the work assignment spreadsheet and outlining features as innovations in project management products. "Instead of treating the project plan as a data base, we put the key elements in a spreadsheet," Cole said.

People assigned to tasks are charted on the vertical axis, activities are charted on the horizontal axis, and work assignments fill the spreadsheet, he added.

The outline format allows users to develop a list of broad objectives and later create a more detailed view of the project. The presentation-graphics component allows users to make overhead charts, which are particularly useful for sales proposals and presentations, Cole said.

Output from Instaplan includes presentation-style Gantt, Gantt-Pert and conventional detail reports.

In addition to the Instaplan package, the firm announced Instaplan Tracker, a $50 project tracking program. Tracker allows the user to compare current activity and actual progress against the original plan, track shifts in cash flow and manhours, and view time and budget changes for each step of a particular project.

The firm recommends 640K bytes with a hard disk drive. The product supports monochrome, color and Enhanced Graphics Adapter modes and most major printers.

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Relational

CONTINUED FROM PAGE 35

compatibles, offers an excellent low-cost introduction to SQL as well. List-priced at $495 in the standard version and $895 in a multiuser version, 10-Base is a powerful tool for developing sophisticated data base applications.

Employed with the Dayton, Ohio-based company's increasingly successful 10-Net local-area network, 10-Base can be used to build distributed data base applications. Users interested in building serious applications on a foundation of networked personal computers will find 10-Base and 10-Net well worth considering.

Relational DBMSs organize data in individual tables that may be dynamically linked. Updates, queries and reports can be done across multiple tables that are connected logically by common values of data elements. The result is a much more powerful and flexible system than older hierarchical, network or simple flat-file data bases could provide.

The SQL syntax provides a language for the manipulation of relational data bases. It makes it possible to define and modify tables, create indexes to speed up data base access, define views of the data and query against the data base. It is nearly certain that SQL will emerge as the key standard for basic relational data base manipulation over the next few years.

Fox's 10-Base provides an SQL implementation that, though it works handily on a personal computer, has nearly the full power and versatility of the basic SQL syntax. It makes it possible to gain experience with SQL easily and at a remarkably low cost.

Limitations SQL-based

The limitations of 10-Base are largely those of SQL itself. Unlike personal computer DBMS packages aimed at beginning users, 10-Base is not totally menu driven. The SQL syntax must be learned before the package can be effectively used. While the complexity of using 10-Base compares favorably to a package like Ashton-Tate's Dbase III, it is not as easy on casual users as a product like Ansa Software Co.'s Paradox.

Nevertheless, 10-Base can be a powerful tool in the hands of a somewhat more sophisticated user or computer professional.

In addition, the recently available Version 3.0 incorporates many features that make it much easier to use than the raw SQL syntax. A data entry editor provides useful extensions to SQL that make it easier to enter and edit data base records.

More sophisticated customization of input forms as well as powerful report formatting capabilities that go beyond the basic SQL query and reporting are available through a forms manager.

The basic SQL ORDER BY syntax is also supplemented with 10-Base's sort extension. This can be used to sort data bases permanently and offers performance advantages when dealing with large data bases. Bridging of data to and from other applications, unfortunately, is available only in conversion to delimited ASCII formats.

However, a powerful procedural language makes it possible to design systems that can easily be used by inexperienced personnel. Optional programming interfaces to Basic and C, priced at $50 each, can also be used for those who want to design even more complex applications.

> USERS interested in building serious applications on a foundation of networked personal computers will find 10-Base and 10-Net well worth considering.

The 10-Base system is architected to employ the relational data base tables for its own internal use. System configuration parameters, lists of the data base's tables, report specifications and other directories are themselves maintained in SQL tables.

An important consequence of this is that 10-Base has an internal data dictionary built in. This naturally follows from 10-Base's maintaining tables of tables in managing its data bases.

10-Base also has a handy facility for saving SQL commands. This is particularly useful since SQL syntax can be very verbose at times. Commands are saved in named files that are retrieved within 10-Base's SQL command editor rather than as keyboard macros. In practice, this works well because the facilities of the command editor make it easy to manipulate saved text as desired.

Data types supported include character, integer, decimal and date. 10-Base can support up to 420 fields per record, 13,000 char. per record and up to 1,550 char. per field. The number of records and indexes per file and files per data base is limited only by the capacity of DOS and the system.

Fox's 10-Base has a lot to offer organizations interested in building data base applications on a platform of individual or networked personal computers. It also makes it very easy to gain initial experience with SQL and relational data base management for a very modest investment.

Zachmann is vice-president of research at International Data Corp.

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Betterbasic

CONTINUED FROM PAGE 35

line is entered. If a Basica program has a syntax problem with an as-yet-unused line of code, it can remain an unsuspected time bomb. In Betterbasic, a bad line of code is rejected just after the Enter key is pressed and, with incremental compilation, GOTOs can reference a table and run much faster than they do in pure interpreters. And Betterbasic loses little of the interpreter's ease.

Betterbasic supports the important block structures such as IF THEN, FOR and WHILE loops, but its real flexibility comes from its procedures and functions. A procedure or function can be declared at any time, and its declaration puts the system into a fresh programming environment. Each procedure or function has its own line numbers, and unless declared differently, all its variables are local.

Procedures are called using only their names. Their parameter lists may require parentheses or not. A passed parameter can be altered by the procedure or protected from alteration, as required, and passed parameters can be given optional default values for use when no parameter is passed.

Different procedures and functions with the same name can be mixed, provided each works with a unique parameter type, and the system will automatically search only functions or procedures, as implied by the program context, when checking against the parameter type passed. Any set of procedures and functions written by a user or acquired elsewhere can be made into a disk module that can then be loaded as a standard part of the system as a whole. Betterbasic can be customized to a degree that is almost unbelievable — and unbelievably convenient.

Betterbasic has a pleasant built-in windowing system, handles errors with sophistication, offers different environments accessible from the DOS command line, has a pretty good built-in editor, supports — with limits — recursive function and procedure calling and has an optional runtime system that will produce independent .EXE files.

Betterbasic's downfalls

Of course, any system has its faults and limitations. Betterbasic is pricey, and NDP support is a sizable extra-cost item. There is no on-line Help system. It presently only supports graphics in color graphics adapter system, which is terrible. The documentation is quite spotty. The introductory material can be embarrassing, featuring such lines as, "You just entered your first command to Betterbasic, and Betterbasic obeyed!" The very powerful and often unfamiliar features in the reference section are not always explained well enough and have far too few examples.

Using Betterbasic is easy. But using it well is not a trivial undertaking. Also, the runtime system, which is quite expensive, produces huge files. Tiny programs start at 45K to 50K bytes; file size does grow rather slowly, however. Recursive operations, which are very useful, are limited by manual stack resizing. As far as I can determine, the program lacks the automatic stack resizing needed for truly free, recursive programming.

An annoying but rather minor matter arises from the incremental compiler. Most program characteristics can be changed easily with the use of an interpreter, but where a type declaration is made, change becomes an involved process. Betterbasic has some hefty restrictions about going into block structures and some minor restrictions about leaving them. This material is just a forewarning.

In summary, Betterbasic should run just about any standard Basic program and run it much faster than the original interpreter. The product allows, and even encourages, anyone from a casual tinkerer to a master programmer to be more productive much more frequently.

T. A. Elkins is a Huntington, W. Va.-based computer and management consultant with a degree in electrical engineering.

Scanner

CONTINUED FROM PAGE 35

fully operational when Handscan is in use.

Handscan has five buttons: four for cursor keys and programmable macro commands and one to activate scanning.

The scanner can transfer minus signs from the back to the front of scanned negative numbers or automatically add a series of numbers and enter only the total.

The user can also configure the scanner to read only numbers or only text characters for specific applications. Handscan supports Lotus Development Corp.'s 1-2-3, Ashton Tate's Dbase III and Multimate, Microrim's Rbase, Micropro International Corp.'s Wordstar and other common applications.

Saba has been developing Handscan for three years and is releasing it as the firm's first product. The firm is also working on technology to scan handwriting, Petkun said. "We think this is a new kind of peripheral and that scanners will eventually read anything," he said.

The scanner is based on standard optical-character reader technology and can read most common office typewriter and printer fonts. The machine does not reliably read typeset text, Petkun said.

Handscan requires a full-slot expansion board and controller software that takes up 180K bytes of memory. The entire package is priced at $649 and is scheduled to be available April 15 through dealers only, Petkun said.

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The MIS perspective.

For years text management software has received scant attention from MIS.

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Second, select a text management approach that combines the features *users* need to obtain information—with the features *you'll* need to maintain system integrity. Users need specialized text search and reporting facilities conventional DBMS's don't offer; you need a new level of system controls dedicated retrieval systems don't offer.

And third, start evaluating text management systems and vendors without delay. You can begin that evaluation today with a look at INQUIRE/Text—the most comprehensive, proven text management software system on the market.

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Traditional corporate information systems do a great job managing structured data. Unfortunately, the information most needed by decision-makers is often unstructured—embedded in the text of documents such as letters, reports, and contracts. Because this material has traditionally been beyond the reach of online systems, access to it has been slow, tedious, and error-prone. Word processors and office automation systems, for all their other merits, have been practically useless in making the actual information content of documents available online.

A text management system fills this void by providing highly sophisticated facilities for online index, search, and retrieval of information in stored documents. With a text management system, users can pinpoint specific pieces of information within vast volumes of text—instantly. And once they've found the information, they can edit, combine, and report it with complete flexibility.

Traditionally, the biggest text management users have been in industries that are subject to extensive regulation and/or frequent litigation. Now others are taking advantage of the systems' capabilities for a broad range of corporate information management tasks. And high on the list of these tasks is competitive intelligence gathering for senior management.

The result has been a dramatic improvement in the quality of information available to decision-makers. And a dramatic increase in pressure on MIS to deliver text management capability.

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As the demand for text management capability has grown, so has the number of vendors claiming to provide it. But few of these vendors offer the features, the flexibility, and the track record of Infodata's INQUIRE/Text.

INQUIRE/Text's automatic indexing and powerful keyword search and retrieval facilities have set industry standards in text management for years. And INQUIRE/Text's capacity, ease of use, and flexible interfacing options have made it a hit not only with end users, but also the MIS personnel charged with implementing it. Finally, INQUIRE/Text's worldwide track record makes it comfortable for top management.

INQUIRE/Text. It's the first thing you need to know about text management. And the only text management software system you'll want to live with. ◆

INQUIRE/Text runs on IBM and compatible mainframes under MVS/TSO, MVS/CICS and VM/CMS.

NEW PRODUCTS

Systems

Applied Data Communications, Inc. has introduced its intelligent personal computer-based **TM500-ST Media Conversion/Duplication system**.

The system is said to translate data between incompatible media formats without requiring additional reconstruction. Media conversion capabilities for more than 500 media formats are possible. Media formats include 8-, 5¼- and 3½-in. diskettes and magnetic tape.

According to the vendor, the TM500-ST eliminates the need for manual clean-up of data. The TM500-ST operates through an interface running on the personal computer.

The TM500-ST is priced at $15,750 including a preconfigured PC-compatible system with a 20M-byte hard disk drive.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680.

Toshiba America, Inc. has added a **supertwist LCD** to its T1100 Plus portable personal computer.

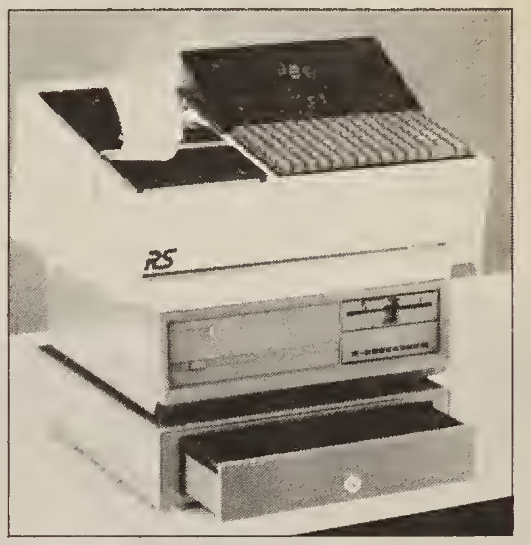
The computer features two 3½-in. 720K-byte diskette drives and interfaces for a red-green-blue monitor, monochrome composite monitor, parallel printer, RS-232C serial communication device and expansion chassis. An external 5¼-in. diskette drive is also available.

The units cost $1,999 for 256K bytes of random-access memory (RAM) and $2,399 for 640K bytes of RAM.

Toshiba America, 9740 Irvine Blvd., Irvine, Calif. 92718.

Rapi-Serv Cash Systems, Inc. has introduced its **RS-2010** point-of-sale system.

The personal computer-compatible RS-2010 is packaged as a cash register but can support various languages and tools. It features a 20M-byte hard disk and a 360K-byte floppy drive. It supports an internal credit-authorization module with credit card scanner.



Rapi-Serv's *RS-2010 system*

The RS-2010 is said to be capable of running all PC-compatible software.

The RS-2010 is priced from $3,659 for a basic machine without disks to $8,140 for a unit with the credit-authorization feature.

Rapi-Serv, 1550 Old W. Henderson Road, Columbus, Ohio 43220.

Daisy Systems Corp. has introduced a line of computer-aided engineering workstations consisting of the **Personal Logician 386**, the **Logician 386** and the **Personal Logician 286**.

The Personal Logician 386 is a desktop 32-bit IBM Personal Computer AT-compatible workstation. The Logician 386 is a 32-bit accelerated graphics workstation. The Personal Logician 286 is based on the PC AT.

All three support Daisy's computer-aided design and engineering applications. All workstations share a single distributed data base, identical icon-based multiwindow user interface and can be configured with SD LAN, Daisy's Ethernet-based local-area network.

The Personal Logician 386 starts at $20,000. The Logician 386 starts at $50,000, and the Personal Logician 286 starts at $15,000.

Daisy Systems, 700 Middlefield Road, Mountain View, Calif. 94039.

Software applications packages

Tempo Investment Products, Inc. has introduced **Market Action Timer**, a software template for performing weekly stock market analysis with Lotus Development Corp.'s 1-2-3.

The program is said to interpret market indexes, moving averages and advance and decline ratios. It utilizes a proven formula for the analysis of advancing and declining issues on the New York Stock Exchange. It compares signals from the formula for a market-indexes moving average.

Market Action Timer costs $149.95.

Tempo Investment Products, Suite 123, 2014 N. Saginaw Road, Midland, Mich. 48640.

Scientific Systems, Inc. has reduced the price of its business forecasting program, **Forecast Master**.

Forecast Master is said to feature statistical techniques ranging from least-squares regression, exponential smoothing, curve fitting and auto correlation through econometric modeling, Box-Jenkins forecasting and Baysian Vector autoregression. The program is also said to handle seasonal decomposition and multi-

Continued on page 43

ext management software,
an handle the competition.

The corporate strategist's perspective.

The amount of information that must be factored into major corporate decisions is increasing every day. And few categories of information are as sensitive or time-critical as competitive intelligence.

Whatever its source, whatever its nature, competitive information can be vital one day—and virtually worthless the next. To be used successfully in the timing and execution of any new initiative, competitive intelligence must be both accurate and actionable—and available to you ahead of your competition. And there's no better way to turn raw information into actionable intelligence than through a centralized online system under INQUIRE/Text.

INQUIRE/Text: Making the most of both internal and external information.

Competitive information comes from many internal and external sources: correspondence and memos, articles in trade journals, press releases, financial reports. Assimilating this information and making sense of it in time to act requires sophisticated text management capability. And INQUIRE/Text provides that capability in a proven, cost-effective manner that meets the needs of corporate strategists as well as MIS.

With INQUIRE/Text, the full range of appropriate internal and external information (in both text and alphanumeric forms) can be maintained online. Document searches can be conducted quickly and accurately, and people can share integrated, relevant information instantaneously—speeding decisions while minimizing potential errors due to faulty or incomplete information.

No wonder hundreds of companies are already using INQUIRE/Text to make the most of their opportunities. No wonder we're convinced it will work for you, too.

A system that pays dividends for many departments—including MIS.

For all its sophistication, INQUIRE/Text is easy for non-DP-oriented users to master. Which makes it especially powerful as a means of presenting strategic information to top management.

But these managers aren't the only ones who benefit from INQUIRE/Text. Many of the features that make INQUIRE/Text such a superior business intelligence tool also lend themselves to other uses in legal departments, regulatory affairs, marketing, the library—and not least of all, MIS itself.

The fact is, INQUIRE/Text is a perfect system for the online maintenance of an almost limitless variety of technical and non-technical documentation. With its large capacity and flexible database facilities (including automatic backup and recovery, usage monitoring and accounting, and multilevel security), INQUIRE/Text protects the organization's interests while serving the individual with unmatched flexibility.

So if you're looking for an intelligent approach to competitive intelligence, start your search with INQUIRE/Text. And finish ahead of your competition. ◆

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Susan Kennedy should know. She's a product analyst at Leasametric, a company that rents, sells, and services DP equipment all over the country. Including thousands of terminals. And since reliability is crucial to Leasametric, they tear each evaluation unit apart piece by piece. Then, they give it a series of tests that make MIT exams look easy.

"Too many terminals just don't measure up," says Susan. "I've seen machines with questionable ergonomics…keyboards that flex in the middle when you type…even cheap little diodes that could drop off.

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And there's more to the 9220 than quality and reliability. There's also an extended feature set, including full VT-220 compatibility. A super-dark 14" amber screen. A tilt and swivel base. 30 programmable function keys. Plus the best thought-out ergonomics around. All for exactly $619.

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Continued from page 41

variate state-space.

Forecast Master is menu driven and includes integrated graphics and Help. Forecast Master costs $595.

Scientific Systems, One Alewife Place, 35 Cambridge Park Drive, Cambridge, Mass. 02140.

Computer Associates International, Inc. has announced **Superimage**, a graphics editor and drawing system for IBM and compatible microcomputers.

Superimage is said to offer such capabilities as freehand drawing of circles, lines, text, boxes and polygons; editing of charts and graphs; advanced functionality for generating backgrounds for artist-quality presentations; clip-art symbol libraries; word charts generated from stencils; and slide service.

Superimage is said to edit standard binary metafiles generated from any mainframe or personal computer graphics software.

Superimage is priced at $495.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.

Visionics Corp. has announced the **2-D Designer** drafting package.

Features of the package include English and metric measurements supported to five decimal places; unlimited size scaling of drawings; creation of polygons, arcs, rectangles and circles using contract points or sketch mode; calculate-area and fill; and macro functions. Users can create and manipulate symbol libraries.

The 2-D Designer runs on IBM Personal Computers and compatibles with 640K bytes of memory. It supports color graphics cards such as IBM Color Graphics Adapters and AT&T Personal Computer 6300 Hi-Resolution. Input devices include Mircosoft Corp. bus or serial mouse and certain digitizers.

The 2-D Designer costs $195.

Visionics, 343 Gibraltar Drive, Sunnyvale, Calif. 94089.

Softcraft, Inc. has announced the **Softcraft Font Editor**, a software program said to allow users to create their own fonts and modify existing ones.

The program works on any IBM Personal Computer or compatible with Hercules Computer Technology, Inc., IBM Color Graphics Adapter or Enhanced Graphics Adapter graphics card. It has full printer resolution and any character created can be saved in a font of as many as 256 characters.

Features include the ability to draw multisegment lines and splines (smooth curves) of specified widths; draw rectangles, circles and elipses; mirror objects around horizontal and vertical axes and rotate them; invert an object; cut and paste; enlarge; reduce; and slant.

Versions are available for Hewlett-Packard Co., Canon U.S.A., Inc. and NCR Corp. laser printers and certain dot matrix printers.

The Softcraft Font Editor costs $290.

Softcraft, Suite 500, 16 N. Carroll St., Madison, Wis. 53703.

Software utilities

Tektronix, Inc. has ported its **Structured Analysis Tools** to the IBM Personal Computer XT and AT.

According to the vendor, the software allows users to automate system modeling using the IBM PC. All operations can be performed via a mouse or cursor-driven window menu environment. Data flow diagrams can be nested 25 levels deep. The PC version is said to support all aspects of a structured analysis specification.

The IBM PC can serve as a local workstation or emulate a Tektronix terminal attached to a Digital Equipment Corp. VAX system.

Structured Analysis Tools costs $1,950.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Supermac Software has introduced **Diskfit**, a hard-disk backup utility for the Apple Computer, Inc. Macintosh.

Diskfit is an automatic program that backs up a hard disk incrementally. It revises the file on the same floppy disk, rather than rewriting the altered files to a new disk. The product keeps all files in Apple standard format that appear as individual icons on the desktop.

Diskfit is priced at $74.95.

Supermac Software, 950 N. Rengstorff Ave., Mountain View, Calif. 94043.

Visual Age has announced **Turbosmith**, a source code debugger for Borland International's Turbo Pascal.

Turbosmith is said to speed and simplify program debugging by providing users with the actual source statements they wish to execute along with the variables the procedure is about to act upon. The program runs as an invisible shell around Turbo Pascal. It provides four window types that provide different views into the Turbo Pascal code. Windows are stackable in levels up to eight deep.

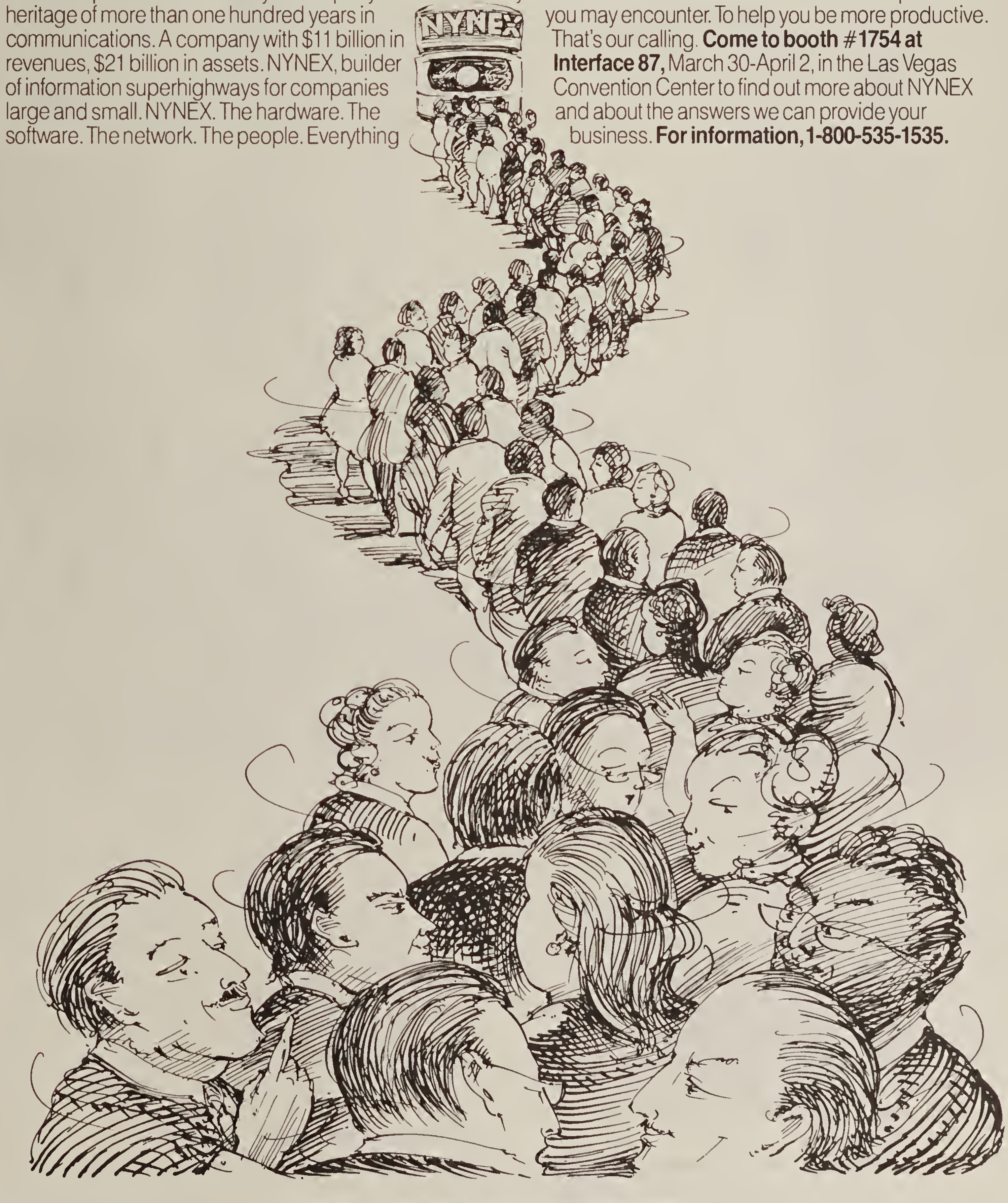
Turbosmith operates on IBM Personal Computers. It costs $69.

Visual Age, 642 N. Larchmont Blvd., Los Angeles, Calif. 90004.

The Font Factory has announced that its library of **Compugraphic typesetting fonts** is now compatible with Xerox Corp.'s Ventura Publisher Edition and White Sciences, Inc.'s Pagebuilder desktop publishing software packges.

The fonts are packaged into 15 separate typeface products including such typefaces as CG Times, CG Triumvirate,

Continued on page 45



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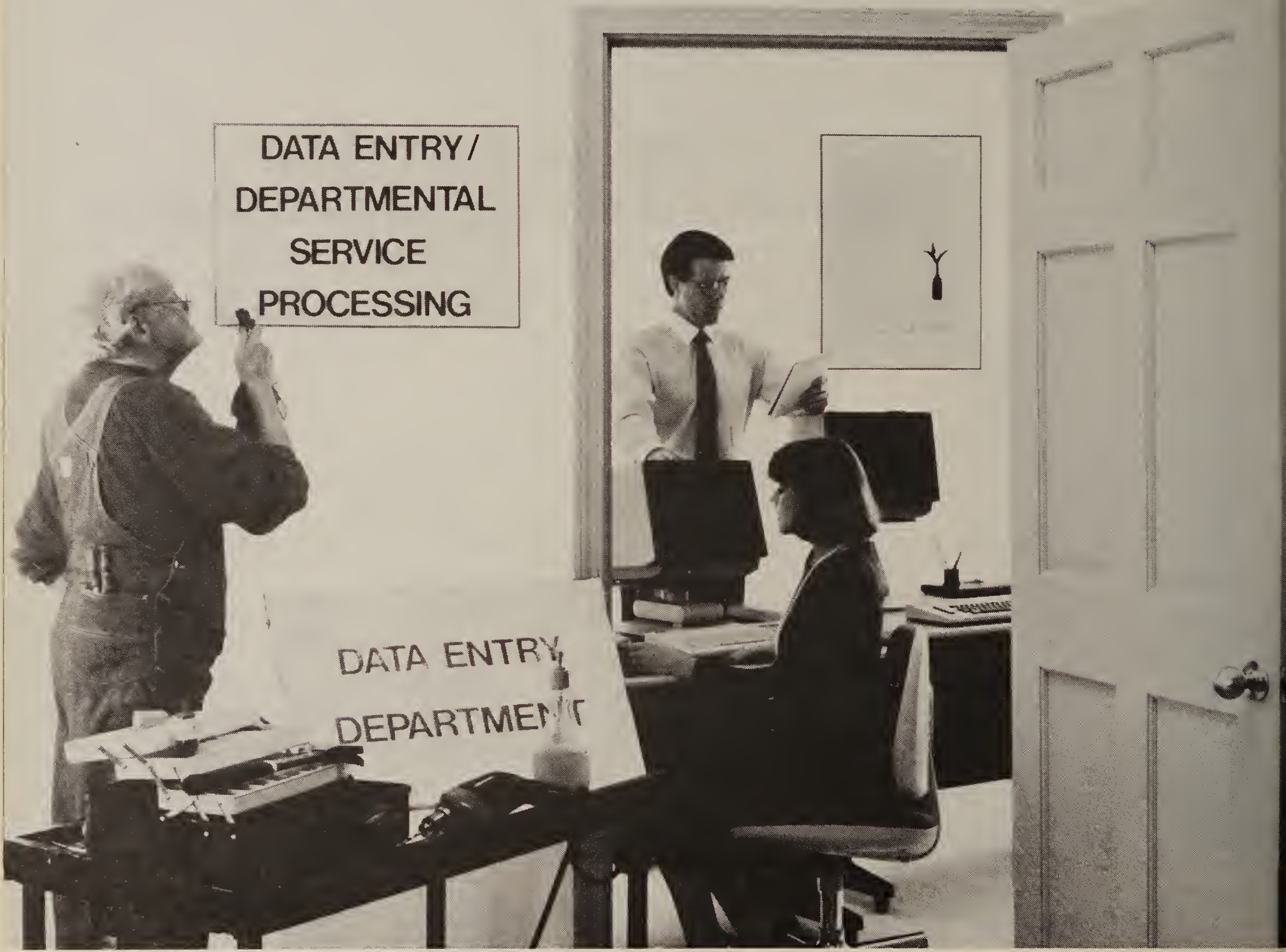

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Continued from page 43

Antique Olive and Century II. The typefaces are provided in normal, bold, italic and bold italic and are provided in point sizes ranging from six to 30 points in both portrait and landscape orientations.

Each typeface family is priced at $199.95 except for the CG Triumvirate, which costs $299.95.

The Font Factory, P.O. Box 5429, Kingwood, Texas 77339.

Software enhancements

Softway, Inc. has announced an **interface for its High Screen** user interface development tool, which is said to make High Screen compatible with Ashton-Tate's Dbase III Plus.

In addition to providing compatibility with Dbase III Plus, the interface provides compatibility with the Dbase compilers from Nantucket, Inc.'s Clipper and Wordtech Systems, Inc.'s Quicksilver programs.

High Screen features screen generation, Help and window management, automatic field checking and menu management.

High Screen costs $129. It runs on IBM Personal Computers and compatibles.

Softway, Suite 222, 500 Sutter St., San Francisco, Calif. 94102.

Computer Associates International, Inc. has announced **Version 4.2** of its **Easybusiness Systems** integrated accounting software.

Enhancements include the ability of General Ledger and Financial Reporter to handle both 12 and 13 accounting periods per year. Accounts Payable features a check reconciliation function that can record and report the status of computerized and manually prepared checks generated by Accounts Payable. Other new features include enhanced transaction editing in Accounts Payable and Accounts Receivable and tailored Job Costing to handle a variety of industries.

General Ledger and Financial Reporter cost $695; Accounts Receivable costs $695; Accounts Payable costs $695; and Job Costing costs $795.

Computer Associates, 2195 Fortune Drive, San Jose, Calif. 95131.

Concentric Data Systems, Inc. has announced **Version 2** of **R & R Relational Report Writer** for Ashton-Tate's Dbase.

R & R is said to allow users to create reports without programming. Version 2 features relational merge, said to allow users to prepare form letters directly from related Dbase files.

The letters can contain detailed records and related calculations. Other features include 16 printer fonts available for fields and texts and the ability to mix fonts and pitches on a report. In addition, line, box and other non-ASCII graphic characters can be selected from menus, memo fields can be queried and fields can be merged and word-wrapped within memo fields.

R & R costs $149.

Concentric, P.O. Box 4063, 18 Lyman St., Westboro, Mass. 01581.

Jurisoft, Inc. has announced that its **Comparerite** document editing software now works with Micropro International Corp.'s Wordstar 2000, Multimate International Corp.'s Multimate, Lifetree Software, Inc.'s Volkswriter and Officewriter word processing packages.

Comparerite is said to enable users to compare two drafts of a document for style and accuracy. Users can compare alternate wording side by side and ensure that changes in text have been made.

Comparerite is priced at $99.95 for use on any one of the supported word processors. Versions that support any two word processors, or all of them, are priced from $129.95 and $159.95.

Jurisoft, 763 Massachusetts Ave., Cambridge, Mass. 02139.

Data storage

Innovative Devices, Inc. has announced **Cardrive**, a plug-in hard-disk card for IBM Personal Computers, AT&T 6300, 6300 Plus and compatibles.

Cardrive offers unformatted capacities of 69M bytes and 83M bytes, no more than 27-msec access time and a data transfer rate of 7.5M bit/sec. It is certified to operate 2.7 Relocating Linker Loader encoding on a 3½-in. hard disk.

Features include a 48-bit error correction code, an 8K-byte buffer, automatic locking of heads in a dedicated landing zone on power down, voice coil actuator, self diagnostics and automatic track deal location for media defects.

The 69M-byte model costs $1,810 and the 83M-byte model costs $1,995.

Innovative Devices, Suite 204, 300 Wheeler Road, Hauppauge, N.Y. 11788.

Acknowledge, Inc. has announced the **Interceptor Series** of portable cartridge-tape subsystems for personal computer backup.

The units are said to provide file-by-file backup and restore functions at streaming speeds and do not require a separate controller card. Formatted tape capacity ranges from 40M to 150M bytes.

Prices for the Interceptor Series range from $1,395 to $1,795.

Acknowledge, P.O. Box 767, Sudbury, Mass. 01776.

Printers/Plotters/ Peripherals

Personal Touch Corp. has introduced

Continued on page 46

A Lesson in Accessing Public Data Networks

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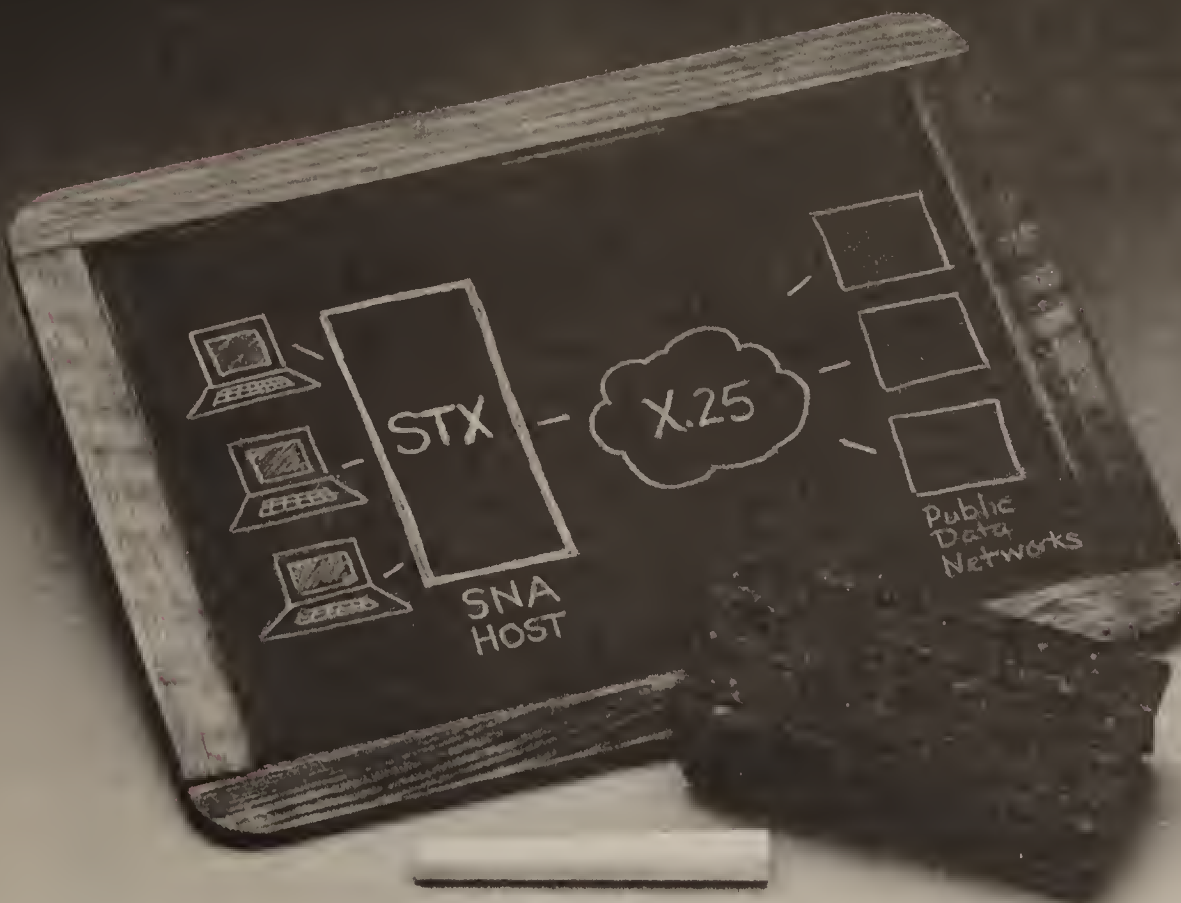

DUQUESNE SYSTEMS

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Continued from page 45

Turbotouch 1910, a 19-in. color touch-screen monitor.

The IBM Personal Computer-compatible monitor is said to accept red-green-blue and National Television Standards Code signals. The monitor has a resolution of 350 television lines and 640 by 240 pixel. The integral touch screen has a resolution of 256 by 256 pixel and can be interfaced to the RS-232 serial port or the analog game port, the vendor said. The transparent touch-screen membrane is attached directly to the front of the monitor glass tube so there is no parallax.

The Turbotouch 1910 is priced at $1,519.

Personal Touch, Suite 290, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Board-level devices

NEC Home Electronics (U.S.A.), Inc. has introduced the **Multisync Color Graphics Board Model GB-1** for use with a NEC Multisync Color Monitor.

The GB-1 features 640- by 480-pixel resolution and 16-color display from a palette of 64 colors. The board offers compatibility with IBM's Color Graphics Adapter, Enhanced Graphics Adapter and Monochrome Display Adapter and Hercules Computer Technology, Inc. modes. Users can display a full page of text, measuring 80 char. by 60 lines, or spreadsheets with up to 132 col. by 44 lines. The board comes with a parallel printer port, a printer-spooler utility, hardware zoom and viewport and Media Cybernetics, Inc.'s Dr. Halo II software.

The GB-1 Multisync Color Graphics Board costs $649.

NEC, 1255 Michael Drive, Wood Dale, Ill. 60191.

Tatung Company of America, Inc. has introduced **Supreme EGA**, an enhanced graphics adapter (EGA) for personal computers.

Supreme EGA is said to run all EGA, Color Graphics Adapter (CGA), Monochrome Display Adapter (MDA), Hercules Computer Technology, Inc. software and a 132-col. test display. The adapter works with any IBM-compatible EGA, CGA, monochrome or composite monitor.

According to the vendor, when running CGA software on an EGA monitor, a resolution of 8 by 14 pixels is displayed, and graphics are double scanned. The card also offers soft scrolling, smooth pixel panning, windowing and 256K bytes of video memory.

Supreme EGA costs $399.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Boca Research, Inc. has announced the **Bocaram/AT**, a memory board for IBM Personal Computer ATs, XT 286s and true compatibles.

The Bocaram/AT is said to offer up to 4M bytes of memory per board. The board may be configured with 128K bytes of conventional memory and with up to 2M bytes of expanded memory supporting the Lotus/Intel/Microsoft Expanded Memory Specification 3.2. A total of four Bocaram/AT boards can be combined.

The Bocaram/AT costs $245 for the 128K-byte version; $395 for the 1M-byte version; $595 for the 2M-byte version; $995 for the 4M-byte version; and $199 for the 1M-byte random-access memory chip kit.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33431.

Paradise Systems, Inc. has announced the **Paradise Autoswitch EGA-480** card, a video-display adapter for IBM Personal Computers.

The card is said to display selected enhanced graphics applications in 640- by 480-pixel resolution and 132-col. modes on multifrequency monitors. It features automatic switching between different video modes and automatic monitor detection. Software drivers for applications such as computer-aided design, desktop publishing, spreadsheets and word processing are included.

The short-size card includes 256K bytes of video memory and costs $599.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.

Vutek Systems, Inc. has introduced the **Short Megamem**, a memory expansion board designed for the IBM 286 XT.

According to the vendor, the Short Megamem permits expansion of up to 2M bytes using 64K bytes of random-access memory (RAM) and 256K-byte RAM chips. The board provides zero-wait states and split memory addressing.

The board costs $230 with no installed memory, $380 with 512K bytes, $530 with 1M byte and $830 with 2M bytes.

Vutek Systems, 10855 Sorrento Valley Road, San Diego, Calif. 92121.

Alps America has enhanced its **Imagenhancer** personal computer add-on board.

The Imagenhancer is said to allow users to produce plotter-like graphics on dot matrix printers. It now accepts output from any software package using Hewlett-Packard Co.'s HPGL plotter commands. Other new features include a pop-up menu that allows users to jump between programs and functions and an interactive installation program.

The board has a 512K-byte storage buffer that can hold data in either printer or plotter modes. It supports all Alps monochrome and color printers in 9-, 18- and 24-pin configurations.

Imagenhancer costs $595.

Alps America, 3553 N. First St., San Jose, Calif. 95134.

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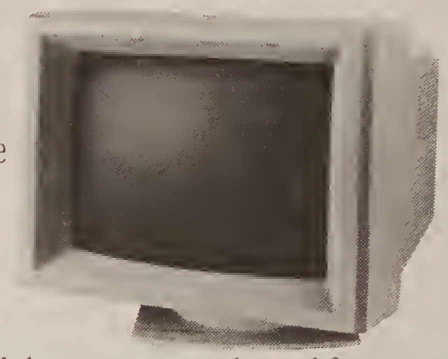

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NETWORKING

DATA STREAM

John Carosella

IBM 9370 anchors nets

IBM's 9370 has turned a lot of heads. It's a mid-size, departmental processor that not only communicates with existing IBM systems — for IBM, a feat in itself — but with other vendors' products as well. I say the real place for the 9370 is as IBM's key to the local networking environment, providing the first real reason to invest in the IBM Token-Ring local-area network (LAN).

After being chastised for years about its uncoordinated mid-range system strategy, Big Blue has finally come up with what everybody had been saying they wanted. The 9370 will support IBM's VTAM, CICS and Distributed Office Support System (Disoss) under the VSE operating system and Professional Office System (Profs) under VM.

And as a full-fledged Physical Unit Type 5 using VSE, the 9370 can do anything the bigger boys can in an IBM Systems Network Architecture (SNA) environment.

IBM is billing VM/IS as a modular, easy-to-install flavor of VM that doesn't require you to have an expensive VM systems programmer on-site. This is critical if IBM wants to sell fleets of 9370s to office environments. Initial reviews of VM/IS

Continued on page 48

Emulator spans IBM, DEC gap

BY ELISABETH HORWITT
CW STAFF

FREMONT, Calif. — Interlink Computer Sciences, Inc. has announced what it claimed is the first product offering to support full-screen terminal access to both IBM and Digital Equipment Corp. hosts.

The 327X Emulator permits DEC VT100 and VT200 terminal users to connect to IBM's Systems Network Architecture networking environment and to access ACF/VTAM applications on IBM mainframe hosts, the vendor said. The VTXX Emulator allows IBM users to log on to a DEC VAX or RSX system as a VT100 or VT220 terminal.

Both software products run on Interlink's existing 3711 Gateway (MVS), a DEC PDP-11 communications front end plus software that converts an IBM MVS host into a communications gateway. "Full-screen IBM/DEC terminal emulation is not new, but other products don't have things like 500K bit/sec. total throughput, bidirectional file transfer and record-level access," claimed Interlink President Lambert Onuma.

The 3711 enables DEC users to access sequential-access method files under IBM MVS and VM operating environments and provides IBM users with access to sequential files on DEC VAX/VMS systems.

Through integration with software from Soft-Switch, Inc., the 3711 gateway also provides electronic mail exchange among systems from DEC, IBM, Wang Laboratories, Inc. and other vendors. The gateway also routes requests and files among multiple DEC and IBM hosts.

The 327X Emulator is priced at $5,950; the VTXX Emulator costs $10,950.

Net offers $100-per-PC link

BY PEGGY WATT
CW STAFF

HOPKINTON, Mass. — Avatar Technologies, Inc. has introduced the Alliance ZSL, a local-area network that uses twisted-pair cable and RS-232 serial ports to connect IBM Personal Computers, PC ATs and compatibles at a cost as low as $100 per PC, the company claimed.

In the Alliance ZSL star-shaped configuration, PCs running proprietary multitasking software communicate directly through virtual circuits established through a central network controller. This eliminates the need for a dedicated file server or for equipping each PC with a network board, Avatar claimed.

While continuing to run a PC application in the foreground, the user can hot-key to Avatar's menu-driven networking software program, send a file to a printer, connect with another PC across the network and send or request a file, Avatar marketing director Neal Checkoway said.

While the system does not support multiuser concurrent data base access through a server, PCs can access one another's file directories and files directly without interrupting applications activity, he explained.

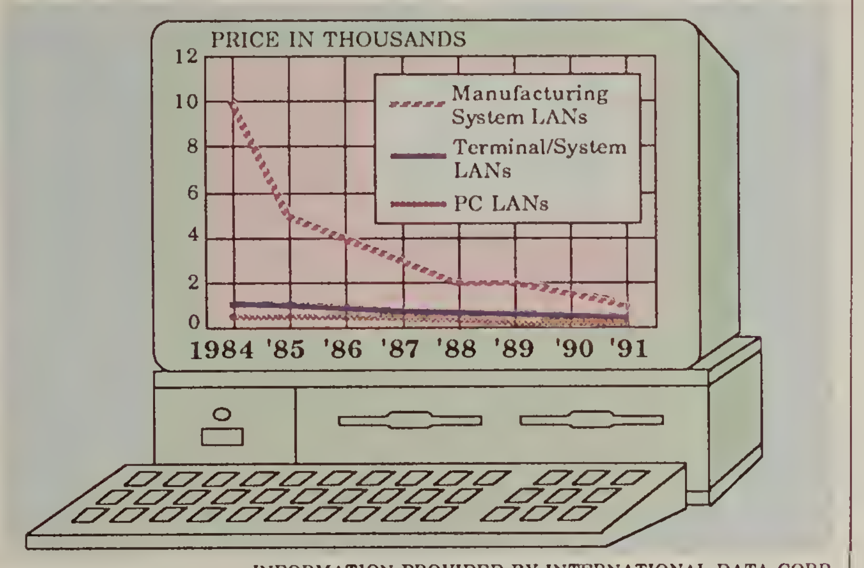
Requests for file transfer are

Continued on page 49

Data View

Factory LAN prices due to fall this year

PC, terminal network prices have leveled off



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: SUSAN ALDAM

Proteon to enhance token-ring

BY DONNA RAIMONDI
CW STAFF

LAS VEGAS — Proteon, Inc. in Natick, Mass., is expected this week to roll out an enhanced Pronet-4 token-ring network product line to support additional IBM Personal Computer networking software as well as support for VMEbus-based computers.

The announcement is due to take place at Interface '87, being held here this week.

The vendor reportedly will introduce upgraded versions of its P1340 PC and P1344 PC AT interface adapters, which link the IBM PC and PC AT, respectively, to Pronet-4. As a result of the enhancements, Pronet-4 will be able to support applications written for IBM's Advanced Program-to-Program Communications (APPC)/PC interface, PC LAN program and Netbios for the Token-Ring network.

APPC/PC implements IBM's LU6.2 peer-to-peer networking protocols on the PC. Netbios and the PC LAN program both provide standardized hooks used by a wide range of PC software vendors to port their packages to IBM PC networks.

Proteon's enhanced interface

Continued on page 49

Inside

- Gandalf Data introduces SSM 2083 four-channel synchronous module. Page 50.
- Micom Systems doubles transmission range and speed of Instalink 460 voice and data multiplexer. Page 52.

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IBM 9370

FROM PAGE 47

have panned its user friendliness, however. Apparently, the addition of a few menus to the installation process isn't enough to simplify an IBM host operating system. On the IBM-to-non-IBM connectivity front, the 9370 will come with slots for plug-in adapters for which both Ethernet and Token-Ring cards are available. Used in conjuction with Transmission Control Protocol/Internet Protocol (TCP/IP), these cards can be used to support LAN-based intervendor communications.

TSAF has potential

Another 9370 element with a lot of connectivity potential is the new Transparent Services Access Facility (TSAF), which runs under VM/SP Release 5. It was designed to enable users running a query program based on IBM's Structured Query Language to access data bases split among up to eight 9370s, which can be clustered together on a Token-Ring network or an Ethernet LAN.

Essentially, TSAF is a VM implementation of Advanced Program-to-Program Communications (APPC) with an important difference: It doesn't require, and in fact cannot use, the rest of SNA. Initially, it makes use of host-channel bisynchronous connections. In the future, support will be available for communications over Ethernets and Token-Ring networks and regular SNA networks. Users will also have to wait for TSAF to attain support of the full set of LU6.2 verbs that provide peer-to-peer communications under SNA.

OK, so the 9370's communications facilities still have a way to go. But let's envision a future 9370 incarnation in which a really user-friendly VM/IS supports TSAF, which in turn communicates with APPC PC, the IBM Personal Computer implementation of APPC. Equipped with a Token-Ring card, the 9370 becomes the primary server for PCs on a Token-Ring network and server functions such as disk sharing and print spooling.

With a configuration like that, IBM could really start playing hardball with the competition in the office systems communication arena. First, it would provide IBM's most fully functioned PC-to-mainframe communications mechanism to date, providing distributed data base functionality that is missing from IBM's file-oriented Distributed Data Manager, and greater micro-to-mainframe functionality than IBM's current Extended Communication Facility.

Through the APPC link, users have access to the mainframe world without sacrificing the native power of their PCs in the process. In addition, using the 9370 as a server would provide IBM with a badly needed anchor for the Token-Ring — and the first real reason to go with IBM for PC networking.

By tightly coupling a mainframe to a PC using a LU6.2-based TSAF-APPC PC interface, IBM will encourage applications developers to write to LU6.2 — and foster a migration away from the less functional Netbios MS-Net networking environment.

Up to now, application developers have held off from LU6.2 because it is extremely complex and processor intensive. The 9370 as Token-Ring server could help IBM wean developers away from companies like Novell, Inc. and Banyan Systems, Inc. that provide standard Netbios interfaces to their essentially proprietary networks.

By providing the 9370 with Ethernet connectivity, a floating-point processor boost and TCP/IP, IBM is drawing a bead on Digital Equipment Corp.'s bread and butter, the engineering niche.

But how about the departmental processing LAN market, which is orders of magnitude larger? The 9370's Profs still has a long way to go before it can give DEC's All-In-1 serious competition. In addition, VM/IS is still far less friendly than VAX/VMS and thus less suitable for the dispersed office environment.

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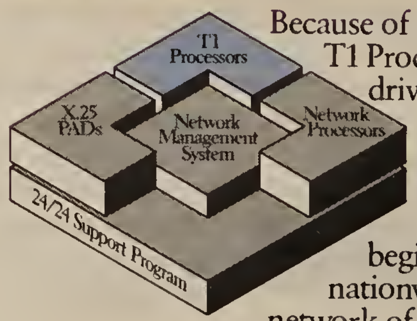

Because of the DCA System 9000 T1 Processor's software-driven, "building block" modularity, your T1 voice/data network can grow from a small two- or three-site beginning, to a powerful nationwide, multi-node mesh network of any size or complexity.

down the road should see the 9370 emerging as a key link between the office PC and MIS department. The 9370 will interact with PCs as peers, leveraging their collective power. At the same time, it will provide departmental processing compatible with existing MIS/DP infrastructure.

In addition to raw horsepower and reliability, the success of the 9370 as Token-Ring server and departmental processor will depend on how quickly IBM and third-party developers can bring to market applications that use TSAF and APPC PC, and just how easy it is to drop what is essentially a VM mainframe into an office environment.

Carosella is a consultant for Fairfax, Va.-based Network Strategies, Inc.

Proteon

FROM PAGE 47

cards also will support IBM's 3270 Emulation Program Version 3.0.

Proteon's Pronet-4 interface cards already support third-party vendor networking products such as Banyan Systems, Inc.'s Vines, Novell, Inc.'s Netware and the Transmission Control Protocol/Internet Protocol.

The enhanced interface boards will support IEEE 802.2 logical link control protocols and IBM's Adapter Support Interface (ASI), which IBM provides as part of its Token-Ring PC Adapter card. Pronet-4 interfaces can communicate or be interchanged with these adapter cards, Proteon said.

Priced at $695, the enhanced adapters are scheduled for commercial release in May. Existing Pronet PC and PC AT interfaces can be upgraded at no charge, Proteon said.

Proteon is also expected to announce the P1542 interface, which links VMEbus-based computers and workstations to the Pronet-4 IEEE 802.5-standard network. This interface will allow high-speed VMEbus-based computers to communicate with personal computers, minicomputers and mainframes on IEEE 802.5 networks such as Proteon's Pronet-4 and the IBM Token-Ring network. The $2,200 P1542 supports either 16-, 24- or 32-bit memory addressing and has full-duplex direct-memory access.

"With the P1542, IEEE 802.5 network users can connect VMEbus-based computers from vendors such as Sun Microsystems, Inc., Charles River Data Systems, Inc. and Motorola, Inc. with IBM PCs, ATs and Multibus-based systems," said Tony Bolton, director of marketing. IBM mainframes can use IBM 3174, 3270 or 3725 Token-Ring network products to communicate with VMEbus workstations using the P1542 Pronet-4 interface. Similar connectivity is available to IBM 9370 and System/36 hosts, Proteon said.

Avatar

FROM PAGE 47

queued in the network controller's buffer. PC networking software has password-controlled network access and file locking.

The Alliance ZSL can connect up to 20 PCs, peripherals or host computers. Asynchronous hosts can be linked to the network and exchange files with PCs using applications based on Kermit, the widely used asynchronous communications protocol. IBM hosts can be linked to the network through Avatar's 3270 gateway product.

Apple Computer, Inc. Macintoshes can be linked to the network controller via serial cable and then can share printers with other network nodes. Checkoway said proprietary software under development will provide file transfer between Macintoshes and PCs on the network sometime in the future.

The network supports transmission rates of 115K bit/sec. for PC ATs and 76K bit/sec. for PCs with no degradation, according to Checkoway. PCs are linked to the network controller via RS-232 connections at distances of up to 500 ft between PC and controller.

The Alliance ZSL is available now. An eight-node package is priced at $1,195. A 14-node package is $1,595, and a 20-node version is priced at $1,995.

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NEW PRODUCTS

Local-area network hardware

Digital Products, Inc. has announced the **Printdirector 6**, a mid-range six-port model of its Printdirector family of printer management systems.

The Printdirector 6 is said to support resource sharing of hardware such as laser or daisywheel printers. The system utilizes asynchronous RS-232 communications, microprocessors and various buffering options. Users can share one or more printers with up to five personal computers.

The system comes with a 250K-byte expandable print buffer and different combinations of I/O ports.

Printdirector 6 costs $795.

Digital Products, 108 Water St., Watertown, Mass. 02172.

Micom Systems, Inc. has introduced **8-4-1**, an IEEE 802.3-compliant, multiport transceiver for Ethernet networks.

The 8-4-1 is said to allow up to eight Ethernet-compatible devices to be grouped together in various stand-alone and network-connected configurations. It provides the user with eight Ethernet transceivers in a single box. In a stand-alone configuration, 8-4-1 acts as a network hub, allowing all stations in the network to be linked with transceiver cabling. The product switches between stand-alone and network-connected modes automatically, the vendor said.

The 8-4-1 is priced at $995 per unit.

Micom Systems, 155 Swanson Road, Boxboro, Mass. 01719.

Gandalf Data, Inc. has introduced a synchronous interface board, called the **SSM 2083**, for its PACX 200 and PACX 2000 networking nodes.

The four-channel, synchronous module is said to allow the PACX systems to be used in front-end and matrix switching applications in networks with IBM, Unisys Corp. and other mainframe computers that communicate synchronously.

Features include 19.2K bit/sec. data operation, support of flexible channel configurations, control-signal pass-through of up to six signals per device, selectable data communications equipment and data terminal equipment configuration and transparent operation.

The SSM 2083 is priced at $1,400.

Gandalf Data, 1020 South Noel Ave., Wheeling, Ill. 60090.

Local-area network software

Waterloo Microsystems, Inc. has introduced the **Port Irma Server**, software said to allow personal computer users on a Waterloo Port local-area network (LAN) to communicate with an IBM mainframe.

The Port Irma Server runs on an IBM Personal Computer or compatible connected to a mainframe via a Digital Communications Associates, Inc. Irma board. Multiple Irma servers can run in the same Port network at only one per PC. Users on other PCs on the Port LAN can share the server for mainframe communications.

Port Irma provides IBM 3278 terminal emulation that can run concurrently with other applications on the PC. Users can transfer files to and from the mainframe. An audit trail of all sessions is provided.

The Port Irma Server costs $995.

Waterloo Microsystems, Suite 200, 3597 Parkway Lane, Norcross, Ga. 30092.

Meridian Technology, Inc. has announced **Carbon Copy Plus**, data communications software for IBM Personal Computers and compatibles.

Carbon Copy Plus is said to combine PC-to-PC remote control, PC-to-host terminal emulation and X-Modem and Kermit file transfer protocols. Terminal-emulation capabilities simulate the Digital Equipment Corp. VT52 and VT100, Televideo Systems, Inc. 920 and IBM 3101.

Features include the ability to operate on an asynchronous dial-up link or direct PC-to-PC connection through serial ports, a log file with full audit trail, dial-back security, remote printer support, support of interactive graphics and pop-up windows.

Carbon Copy Plus costs $195.

Meridian Technology, Suite 120, 1101 Dove St., Newport Beach, Calif. 92660.

Network management

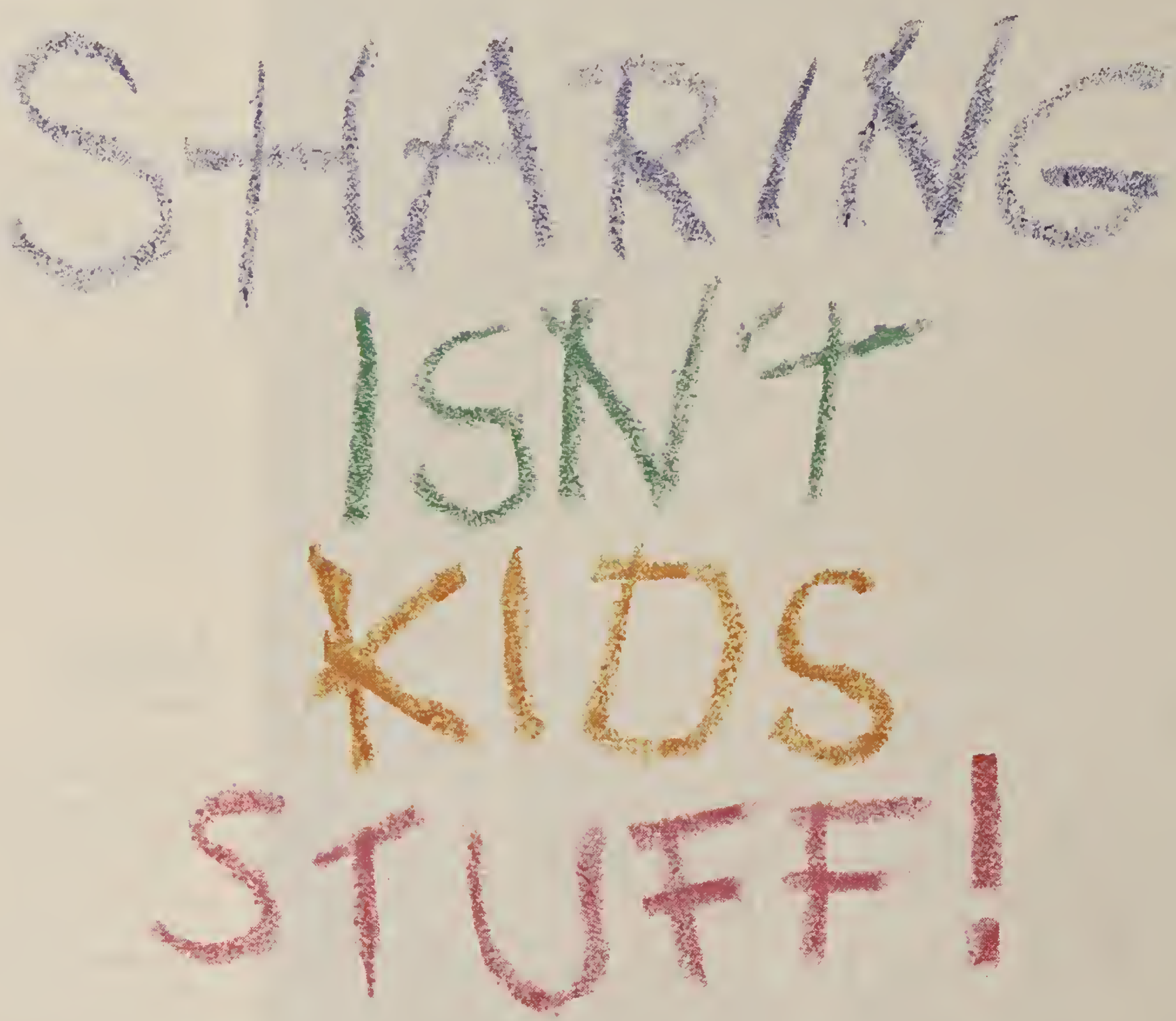
NCR Comten has announced **Comten Overview**, a network control and management software product.

The software is said to allow a single-system console to consolidate information for local and remote Comten 3600 and 5600 communications processors operating in either Systems Network Architecture (SNA) or non-SNA networks. It monitors incoming information such as trunk and X.25 statistics from the communications processors to which it is assigned. A single-operator console can monitor up to 20 communications processors.

Features include command lists, an alert window and operator Help screens.

The initial license fee for Comten Overview is $600. The continuing license fee is $200 per month or $2,200 per year.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.



In a multiple CPU environment, Duquesne Systems' shared device software products provide single system data protection and operation efficiency.

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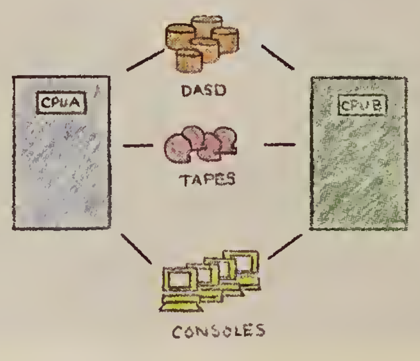

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Telcor Systems Corp. has announced the **Network Administrator.**

The Network Administrator is said to allow host-site personnel working at a personal computer to monitor and control an entire dial-data network. According to the vendor, it can directly set all the option and security parameters of both host-site and remotely located Telcor modems without operator assistance.

Features include immediate status reporting, maintenance of an audit trail of all network traffic, a variety of security procedures and compatibility with 212A and 103 modems. The units also contain Telcor's data compression technology, said to increase data transfer rates to 9.6K bit/sec. full duplex.

The Network Administrator software costs $895.

Telcor, 12 Michigan Drive, Natick, Mass. 01760.

Customer-premise equipment

Natural Microsystems Corp. has introduced **Watson VBX**, an IBM Personal Computer-based voice messaging and telephone management system for businesses with up to 100 employees.

Watson VBX is said to automatically answer incoming calls, route calls to the proper extensions and record and deliver voice messages. It consists of four application systems: call director, outbound telemarketing, voice mail and voice bulletin board. It also comes with Watson VIS, which allows users to create custom applications.

Watson VBX, consisting of two Watson circuit boards, voice branch exchange software and an IBM PC AT-compatible microcomputer, costs $8,495. A Watson VBX Upgrade Option, including everything except the microcomputer, costs $3,995.

Natural Microsystems, 6 Mercer Road, Natick, Mass. 01760.

Xerox Corp. has announced its **Xerox Voice Message Exchange System V** designed to serve 800 to 10,000 users.

System V is said to be able to handle more than 3,000 calls per hour and to store up to 526 hours of messages. It is available with 12 to 64 ports and is compatible with the entire Xerox Voice Message Exchange line.

The system incorporates double-density disk drives. It features a front panel display and a control microprocessor, according to the vendor.

System V costs from $123,000. It may be rented annually starting at $4,700 per month.

Xerox, Xerox Square, Rochester, N.Y. 14644.

Links

Computer Protocol Corp. has announced **CPBlue**, a micro-to-mainframe communications board for information transfer between IBM and compatible personal computers and host systems.

CPBlue is said to support more than seven protocols and emulations. It can be connected locally via synchronous or asynchronous cable or remotely by modem. It offers data transmission speeds of up to 19.2K bit/sec. and does its own formatting, according to the vendor. It also allows simultaneous access to wide-area and local-area networks.

CPBlue is priced at $795.

Computer Procotol, Exchange Complex, 155 West St., Wilmington, Mass. 01887.

Attachmate Corp. has enhanced its **Coaxstation** and **Remotestation** personal computer to mainframe software.

Release 3.0 retains all original Attachmate features such as multiple mainframe sessions, windowing, file transfer and printer emulation. Additional functions include 43-line by 132-col. display, support for IBM's Send/Receive file transfer including IBM Structured Field protocol, an application program interface compatible with IBM's 3270 Personal Computer Emulation Program Version 2.0 or 3.0 and improved printer support.

The software is included with Attachmate 3270 coaxial and remote adapters. It costs $395 when purchased separately for use with IBM Adapters.

Attachmate, 3241 118th S.E., Bellevue, Wash. 98005.

Intelligent Technologies has enhanced its **Bisync Exchange 3780 Communications System.**

Designed to allow remote connections of personal computers to mainframe or minicomputer hosts, the new model features 3780 Remote Job Entry running under Concurrent DOS and 19.2K bit/sec. transfer speed. According to the vendor, foreign character support is provided as well.

Bisync Exchange 3780 costs $695.

Intelligent Technologies, 737 Lincoln Centre Drive, Foster City, Calif. 94404.

Novell, Inc. has announced the **Netware Remote Bridge X.25** and **Netware X.25 Gateway.**

The products, developed with Eicon Technology Corp. in Montreal, were designed for wide-area communications and support X.25 protocol.

The Netware Remote Bridge X.25 provides invisible remote connections between multiple Netware local-area networks (LAN).

It can communicate with any X.25 public or private network and up to 32 remote Netware LANs through a single synchronous dial-up or leased-line connection. The product supports up to 64K bit/sec. transmission, according to the vendor.

The Netware X.25 Gateway allows users to communicate and share data with non-Netware environments. It uses asynchronous terminal emulation software to initiate a session on a remote X.25 host through the gateway.

Both products cost from $1,995.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

Technology Concepts, Inc. has announced **Community-DOS/UB**, a software package designed to allow IBM Personal Computers to access Digital Equipment Corp. VAX systems.

Community-DOS/UB operates with an Ungermann-Bass, Inc. Personal-NIU intelligent Ethernet controller and allows the personal computers to become nodes in a Decnet Phase IV network.

Users can take advantage of such Decnet Phase IV functions as task-to-task communications, file transfer, remote directory, virtual terminal and network management.

The software costs $600 per PC. The Personal-NIU intelligent controller costs $895.

Technology Concepts, 40 Tall Pine Drive, Sudbury, Mass. 01776.

Software Results Corp. has announced the **Comboard Unix/SNA Q-bus.**

The Comboard Unix/SNA Q-bus is said to be a hardware and software interconnect that allows Digital Equipment Corp. computers to communicate with IBM and other central mainframes. It works as a front-end processor handling all character translation, compression and decompression, transmission error recovery and

Continued on page 52

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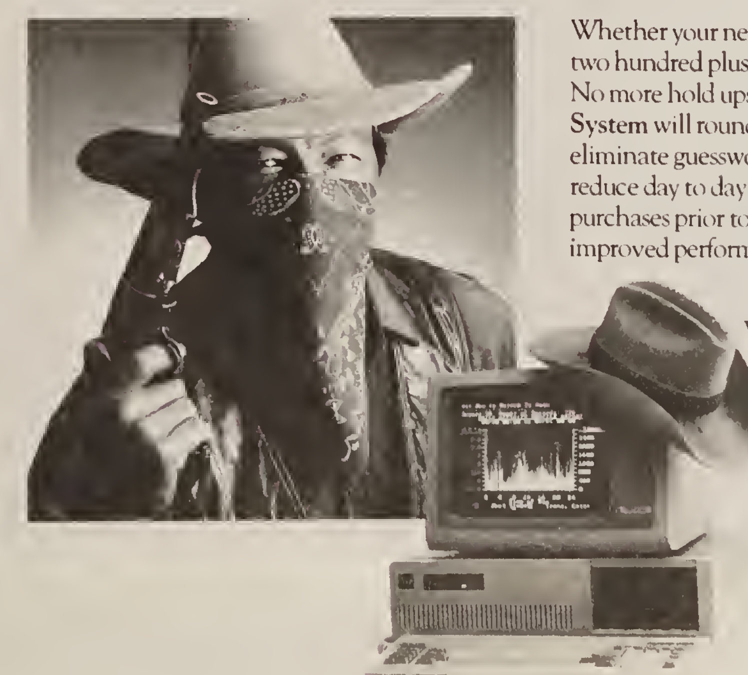

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Continued from page 51

other protocol operations.

It supports 3278 terminal, 3777 remote job entry file transfer and 3287 printer emulation software, according to the vendor. It operates at speeds up to 56K bit/sec.

The Comboard Unix/SNA Q-bus costs from $8,700 to $11,300.

Software Results, 2887 Silver Drive, Columbus, Ohio. 43211.

Communications Solutions, Inc. has enhanced its **Access/BSC** 3270 software said to enable microcomputers and multiuser workstations to remotely access and process information on IBM mainframes.

Release 3.0 of Access/BSC is said to provide IBM 3270 Personal Computer-compatible file transfer capability, international keyboard mapping and extended screen attributes.

Access/BSC 3270 emulates IBM's bisynchronous 3274 and 3276 communications controllers, 3278 and 3279 display terminals and 3287 printers. Release 3.0 is available in Unix and Microsoft Corp. MS-DOS versions.

Access/BSC is available as source code. It costs from $150 per node.

Communications Solutions, 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Electronic mail

Western Digital Corp. has announced that it is bundling **The Network Courier**, an electronic mail software applications package from Consumers Software, Inc., with its Starlan products.

The Network Courier is said to allow local-area network users to exchange messages and complete files without having to exit current applications. Mail and files can also be exchanged with remote networks, the vendor added.

The Network Courier operates on any Netbios-compatible network. It requires 192K bytes of disk space on the network server.

The Network Courier costs from $295.

Western Digital, 2445 McCabe Way, Irvine, Calif. 92714.

Modems/multiplexers

Lantel Corp. has added five modems to its **Series 900** line.

Called T-Channel modems, the units are said to be channel-selectable in 50 kHz increments from 23.75 mHz to 41.75 mHz. The modems include the 900 A for asynchronous data communications to 9.6K bit/sec.; the 900 S for synchronous or asynchronous communications to 19.2K bit/sec.; the 900 T for voice hot lines; the 900 BPT portable voice unit; and the 900 DC for telephone-to-private branch exchange links and off-premise extensions.

The 900 A costs $820; the 900 S costs $1,080; the 900 T costs $980; the 900 BPT costs $1,290; and the 900 DC costs $980.

Lantel, 3100 Northwoods Place, Norcross, Ga. 30071.

Micom Systems, Inc. has announced that it has doubled the data transmission range and speed of its **Instalink 460** voice and data multiplexer.

The Instalink 460 is said to provide point-to-point data channels for connecting data terminals and personal computers with host computers.

According to the vendor, it now transmits data up to 23,000 ft at up to 19.2K bit/sec.

It also provides synchronous or asynchronous transmission in a single unit.

An Instalink 460 system consists of terminal units located at the telephone and central units at the private branch exchange end of telephone circuits, the vendor said.

Prices for terminal units start at $195 and central units start at $750.

Micom, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

Diagnostic equipment

Verilink Corp. has announced its **Extended Superframe (ESF) Diagnostic System** and **551VST ML Network Management Controller**.

The ESF Diagnostic System is said to collect, display and gather real-time T1 performance data from Verilink's ESF Channel Service Units.

The 551VST controller is said to house up to 28 ESF Channel Service Units and a Network Management Controller. It is compatible with D4 or ESF Data Terminal Equipment and is said to provide T1 users with logic-error performance information gathered on the users' own data while the line is in service.

The ESF Diagnostic System is priced at $5,000. A 28-line configuration for the 551VST, including the Network Management Controller, is priced at $1,990 per T1 line.

Verilink, 145 Baytech Drive, San Jose, Calif. 95134.

The Network Evaluation and Test Center of the Industrial Technology Institute has announced a **MAP 2.1 Conformance Test Package.**

The software is said to allow users to pre-evaluate product conformance to the Manufacturing Automation Protocol (MAP) 2.1 specification. It contains MAP 2.1 protocol test systems, including Network Management, Directory Services, FTAM, computer-aided software engineering (CASE), Session, Transort, Internet, Executable Test Cases and a test-system manager program.

The test package also contains a software tool kit including protocol monitors for Transport, Internet, Session and CASE as well as a Transport protocol analyzer.

The Conformance Test Package works on a Sun Microsystems, Inc. Sun-3/160M-512 workstation. It costs $20,000.

Industrial Technology Institute, P.O. Box 1485, Ann Arbor, Mich. 48106.

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The Solution: Now, the *All Hands On C Video Workshop* gets staff up to speed faster and better than ever before, at far lower cost. The workshop contains six professionally produced video modules that teach the full features and capabilities of the C language from operators and expressions through pointers and structures.

Students review lesson content with workbook exercises, and each module builds practical programming experience with sample programs provided on the C Video Workdisk. The package includes the acclaimed text "Learning to Program in C" by Dr. Thomas Plum, international authority on C and technical advisor to Hands On Learning.

The Secret: Roeder and his company have helped thousands to master computers and software. The secret of their system is its focus on people: using human experience to teach technical concepts. "It's like learning by osmosis" says one student, "I had no idea I was getting so much. When the tapes ended, I just started programming."

The All Hands On C Video Workshop is available in VHS or Beta at $995, and other formats at additional charge. We are sure you will find it an exceptional value. However, if you are not fully satisfied, return it for a full refund for up to 30 days. To order, or for more information, please call us or send this coupon with your business card or letterhead. Thank you.

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COMPUTERWORLD

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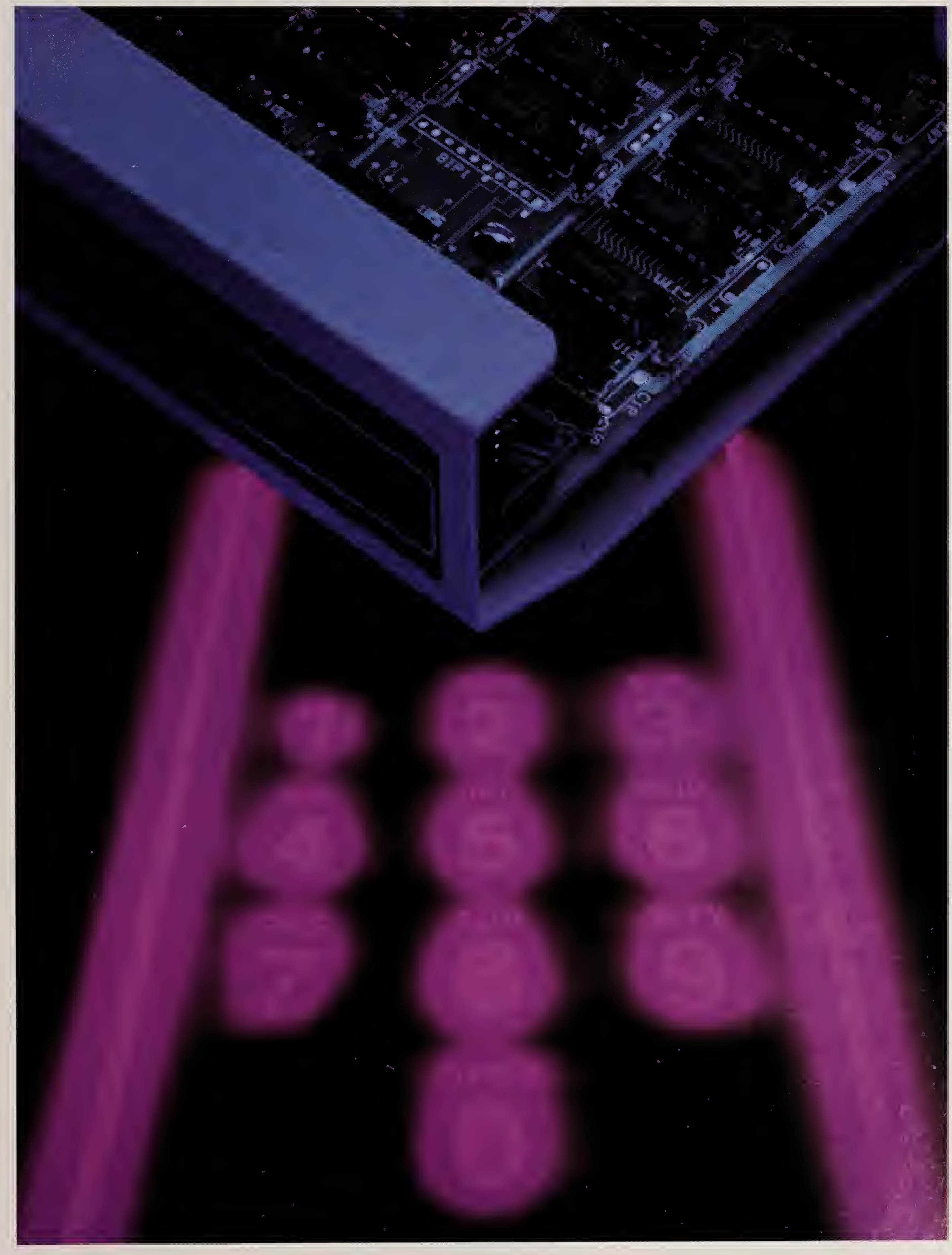
SPOTLIGHT

MODEMS



Communication interface units are evolving rapidly, if only to keep pace with developments in telecommunications network technology. The new breeds are not only faster but are more flexible and more intelligent.

MARCH 30, 1987 • SPOTLIGHT NO. 5

We designed our V.32 modem on the premise that speed is useless without reliability.

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INSIDE

Banking Connections

Digital telecommunications equipment and services promote cooperation among Texas ATMs. Page S2.

Product Face-Off

Comparisons of leading products in both medium- and high-speed categories reveal differences in approach and applicability. Pages S6 and S13.

Fiber for Health

Fiber-optic modems and multiplexers and a fiber-optic network improve the cost outlook for a health complex. Page S7.

Ask the Vendor

Modem users interrogate manufacturers about standards, cabling requirements and upgrade paths. Page S9.

Vendor Viewpoint

Standards serve a purpose, but waiting for them to develop can take the edge off technology. Page S10.

Product Charts

Comprehensive guides to fiber-optic and digital modems, including features and prices. Pages S11 and S14.

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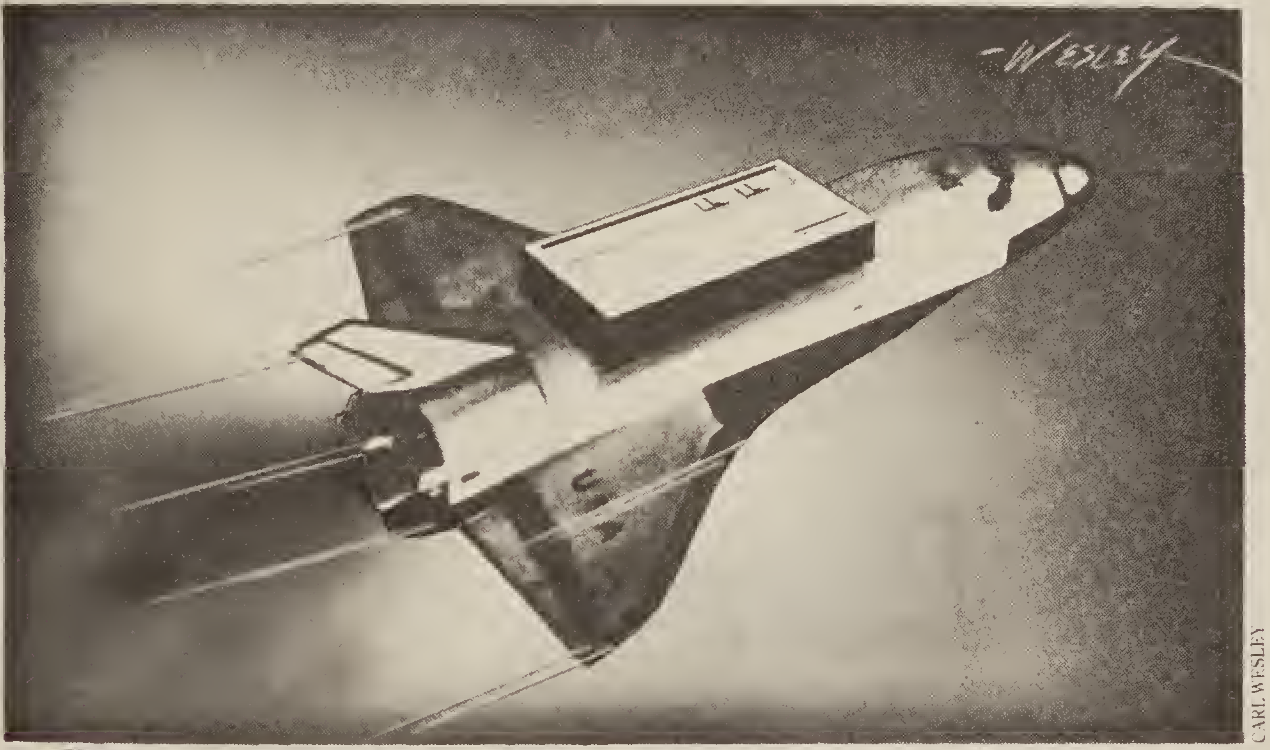
Modems are breaking old speed barriers and moving into new spheres, such as data framing and protocol conversion.

FRONTIERS IN DATA DISPATCH

BY DANIEL GROSS AND BRUCE PAGE



CARL WESLEY

Once secure in its role as a digital-to-analog converter, the modem is now called by names it never knew it had: digital modem, line driver, fiber-optic modem — none of which perform digital-to-analog signal conversion. Whatever the name, modems still perform the same essential task of converting computer data into a form in which it can be transmitted over a telephone network.

But today's telephone network is changing so rapidly that the term "data communications" means something different from one day to the next. Dial-up circuits compete with leased lines for speed; T1 break-even costs fall through the floor; and software-defined voice and data networks lay new foundations for building private and public networks.

The extent of consequent modem transformation is apparent in corporate data communications centers where self-diagnosing, multiplexing, digital computers, using the latest microprocessor technology, calculate complex mathematical functions and gather real-time data about network traffic and line quality. These computers are fully interactive, but they have no screens, no keyboards and no mass storage. These computers are modems.

Advances on all fronts

Technological advances in modems fall into three categories: analog dial-up, digital leased line and fiber-optic line.

The voice, or public, network has a bandwidth of 4.8 KHz. Until recently, this meant the speed limit of dial-up modems was set at 9.6K bit/sec. However, recent breakthroughs forged in transmission technology have made much faster dial-up speeds possible. In the dial-up world, two commercially available techniques — data compression and a new method of continual line analysis — have gained acceptance as reliable methods of increasing throughput on analog dial-up circuits.

The continual line-analysis method now being used cuts the bandwidth in a standard phone line into several channels and sends portions of a data stream along each of them. This technique is conceptually similar to multiplexing but is used for sending data over a single channel rather than several.

In addition to increasing data transfer rates, this scheme constantly monitors the transmission quality of each channel. It also dynamically selects the number of channels that would be used for sending and receiving, a method known as adaptive duplex. The Trailblazer modem from Telebit Corp. in Cupertino, Calif., achieves communications rates of 18K bit/sec. using this technique.

Telcor Systems in Natick, Mass., recently announced a patented data compression algorithm that achieves an average 4-1 ratio on data. Since there is four times less data to send, the Telcor Systems Accelerator quadruples the effective speed of a modem.

For example, with a regular 9.6K bit/sec. modem, Accelerator users can send data at effective

---

Gross and Page are principals of Magnetic Press, Inc., a New York software development firm. The company specializes in custom-designed software for data base, graphics and communications applications.

Frontiers

CONTINUED FROM PAGE S1

rates of up to 38.4K bit/sec. over normal dial-up phone lines.

There are some important implications attached to the new high-speed dial-up modems. First, they may be used on existing analog, unconditioned dial-up lines. This increases the usefulness of these modems and allows them to be used anywhere at any time, even for occasional or portable use. Second, these technological advances are generic and may eventually be applied to existing digital and fiber-optic channels as well as to analog circuits.

Standard dial-up modems have speeds of 300 or 1,200 bit/sec. Some users have moved to 2,400 bit/sec. now that it has become less expensive and more widely available, but the industry did not see the great migration it enjoyed when people flocked in droves from the 300 to the 1,200 bit/sec. speed. Part of the reason is that 2,400 bit/sec. is an awkward speed: It is faster than what most occasional users feel they need but too slow for anything more than remote access.

A speed of 2,400 bit/sec. is a sort of threshold: Slower speed modems are associated with personal computing and occasional data transmission, whereas 4.8K bit/sec. is frequently the lowest cost-effective speed for leased-line users.

The recently formalized CCITT V.32 standard for dial-up communications at 9.6K bit/sec. led to a flurry of 9.6K bit/sec. dial-up product releases. While the standard is set, 9.6K bit/sec. is still quite fast for most noisy telephone lines.

This situation may change with the use of more digital switching products and fiber transmission, which result in cleaner end-to-end circuits than those of older network technologies. But more than 80% of end-office switches in the telephone network are still analog switches, leading to the conclusion that 9.6K bit/sec. will remain the practical speed limit in dial-up applications for some time, at least for modems that use Bell and CCITT standards.

Dial-up vs. leased lines

Most users make the jump to leased, conditioned lines for reliable data transmission. It's possible, though that what is really needed is not leased lines, but faster modems. If you are using 2,400 bit/sec. dial-up and your data phone bill is less than twice the cost of a leased line, you win in the long term by buying 4.8K bit/sec. dial-up modems instead of leasing the phone line. Even if your data transmission needs increase, many higher speed dial-up modems will work on leased lines as well.

For even greater control, most communications software allows you to specify a dial suffix for the modem. By using suffixes intelligently, telecom managers can set up an accounting system for reporting data calls in conjunction with a call accounting system normally used only for voice calls. Hence, dial-up modems provide better cost control than leased lines, which have fixed prices regardless of data traffic.

While high-performance dial-up modems will reduce the need for some users to install new leased circuits, many users will still need the better data integrity and, for volume users, lower cost of leased lines.

DDS and digital modems

Beginning with AT&T's Dataphone Digital Service (DDS) and moving toward the Integrated Services Digital Network (ISDN), increasing use of digital technology promises to bring even greater speed and flexibility.

Originally developed in predivestiture days, DDS is now an AT&T trademark. The divested Bell operating companies developed their own product names for digital leased-line service.

DDS and its clones are synchronous, 2,400, 4.8K, 9.6K and 56K bit/sec. leased private lines. Since they are not switched services, these lines offer better bit-error rates than their dial-up counterparts. In addition, various degrees of line conditioning make it possible for DDS circuits to support data speeds of up to 56K bit/sec.

DDS may be used in either point-to-point or multipoint networks. In the case of multipoint networks, most telephone companies that offer DDS service will perform bridging between network hubs, creating a leased network in which any node on the network can talk to another.

Since there is no need for them to convert digital signals to analog, DDS customers, in place of a standard modem, use a data service unit/channel service unit (DSU/CSU), also known as digital modem, to connect to their digital leased-line service. The DSU part of a DSU/CSU is used to prepare the data stream for entering the digital network, performing such tasks as data framing, network addressing and so forth. The CSU half of the unit provides a loopback circuit for testing the data link from telephone company offices.

DSU/CSU equipment vendors abound because demand is growing at a fast clip. The units are also getting cheaper. According to Bob Brown, product manager for Digipath digital service at New York Telephone Co., "The DSU/CSU needed to connect with DDS service is less technically complicated than most modems, particularly the higher speed modems. Therefore it costs less while providing, in most cases, higher speed and more reliable data transmission than can be achieved over analog lines."

COM, Inc. in Wheatridge, Colo., offers an interesting solution for leased-line modem users. COM's VNS-COM is a high-speed network controller for leased-line circuits. It allows companies to set up their own hybrid networks of private and public lines by providing an automatic roll-over capacity to handle peak data transmission periods. Companies that use the COM switch can save money by buying leased lines for their continuous data transmission needs and using dial-up lines for the peak period overflows. VNS-COM can also be used to provide automatic dial-up redundancy for leased circuits.

The impact of fiber-optics

Just as dial-up users eventually find a point at which it is cheaper for them to switch to digital leased services, DDS users also find a point at which it is cheaper to maintain a T1 circuit than it is to continue leasing several DDS links.

The break-even point on leasing T1 circuits has dropped dramatically in the past several years, making T1 the fastest growing transmission service at both AT&T and the nation's telephone companies. A digital service, T1 circuits move 24 64K-bit channels together on a point-to-point route.

The point-to-point nature of T1 is disagreeable for many users, but there is a new technology that allows T1 networks to be created using fiber optics.

At Fiberlan, a systems integrator in Research Triangle Park, N.C., engineers have developed the TDM Ring, a T1 transport technology that uses fiber coupled with M13 multiplexers to switch bit streams anywhere from DS-0, a 64K-bit channel, to DS-2, which consists of four T1s. The TDM Ring is a fully redundant system that handles both voice and data service. Its maximum capacity is 28 T1 links, making it ideal for campus-style industrial environments.

To install the TDM Ring, users place T1 DSUs at all points of entry to their private network. Instead of providing only a point-to-point T1 link, the TDM Ring allows users to switch voice and data in a multipoint configuration. They get the benefit of unswitched leased-line transmission quality and the configuration flexibility of a switched network. It is a bit like having your own private dial-up T1 network.

Customers interface with the TDM Ring at standard T1 rates or lower. There is no need for special equipment. Companies using RS-232, V.35 or other media can multiplex signals together into a T1 using products such

Continued on page S3

ATM network holds all the cards in Texas

BY BRUCE PAGE

One of the most important and exciting uses of telecommunications and computer technology in recent years has been the growth of automated teller machine networks.

"In Texas, 98% of the financial institutions are members of one network or another," says Mike Shea, vice-president of operations at Transfirst Corp., operator of the Moneymaker ATM network.

Along with Moneymaker, the networks include Mpact and Teller 24. The Pulse network, in turn, connects the regional networks into one vast, all-embracing ATM network in which any ATM accepts nearly any card from any Texas bank.

As recently as five years ago, such a concept would have seemed a nearly impossible dream of bureaucratic cooperation and technical dexterity. But digital telecommunications services and equipment made that dream a reality.

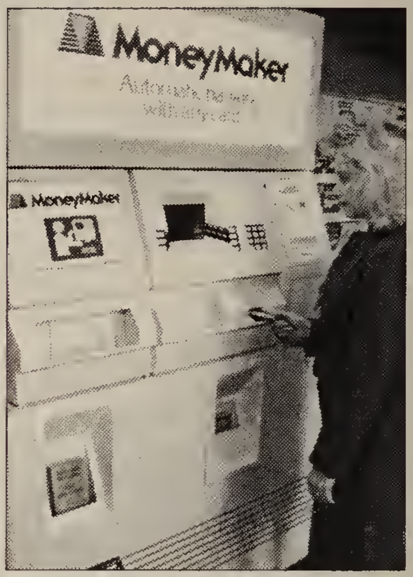
> FIVE years ago, an all-embracing ATM network would have seemed a nearly impossible dream of bureaucratic cooperation and technical dexterity.

Transfirst built its financial network on Tandem Computers, Inc. processors, digital service unit (DSU) equipment from Racal-Milgo and Megalink digital data service from Southwestern Bell Telephone Co.

Transfirst, a subsidiary of First Texas Bancorp, is the country's largest operator of off-bank-premises ATMs, supplying network communications to more than 750 ATMs dotting the state from Dallas to El Paso. In addition, it supplies electronic funds transfer and credit verification services to banks and financial institutions nationwide.

Since Transfirst's business revolves around the transmission of computer-based information, the cost of the telecommunications network is one of its largest business costs, according to Shea. "Any way we can reduce our telecommunications costs while maintaining or improving service levels improves our profitability," Shea says.

Recently, Transfirst upgraded its leased-line network from the Megalink 2, a digital leased service of Southwestern Bell, to Megalink 1, which includes secondary-channel capability. Racal Milgo Model 1500 DSUs provide both interfacing to the digital 2.4K-bit lines and secondary-channel capability for network management and diagnostics.



Linked *with Texas ATMs*

According to telecommunications manager Dale Quisenberry at Transfirst, Megalink 1 lowers costs and brings better service to the Moneymaker network.

Transfirst's Shea observes, "We get all the quality of digital service and also get the diagnostic channel. That allows us to lower the price a little and get quality up."

"We were never able to get diagnostics from a digital line before. With the secondary channel of Megalink 1, along with the DSUs from Racal-Milgo, we can," Quisenberry says.

Currently, the Moneymaker network maintains a single processing center in Dallas with Tandem TXPs. All ATMs in North Texas are connected directly to the processing center by the Megalink network — the first multipoint application of that network to date.

In addition, Moneymaker has two points of presence in Austin and Houston from which transaction data is multiplexed and then sent to the Dallas processing center on fiber-optic lines. In areas that do not yet have access to digital services, Moneymaker uses 4.8K bit/sec. Omnimode 48 modems from Racal-Milgo on standard analog lines.

But the advantages of digital technology are compelling: higher quality, lower overall costs and better control.

"The Megalink," Shea says, "helps us improve our business overall." •

Frontiers

FROM PAGE S2

as General Datacomm, Inc.'s Megamux. It is also possible to interface Ethernet and token-ring local-area networks to the TDM Ring.

TDM Ring is just the beginning of a pervasive move toward fiber-based network services both public and private. What is happening here? The history of technology repeats itself: Just as no one is sure where to draw the line between a phone and a computer or a mini and a mainframe, the new generation of data communications products makes it unclear where the modems end and the multiplexers begin.

The distinction between product and service is also blurring. Less equipment is needed on customer premises; more is found in the central office or built in to the network itself.

Modem innovations

Two of the most important features being added to modems are remote control and diagnostics. These capabilities will make life much easier for private-network managers, who will now be able to test, configure and control remote equipment from a single central site. This kind of flexibility is being built into modems across the spectrum: low-speed dial-up, low- and high-speed leased lines and fiber-optics.

The visionary promise of such systems is the ability to gather information about network behavior in real time, proving an enormous boon to network management because it will allow network planning to be backed by actual data rather than estimates. Vendors offer complete network management systems in which all current traffic and routing information can be viewed on a single terminal or even a PC with software that allows custom reporting of network status.

These new modems and DSU/CSU devices also allow end-to-end testing of a circuit via remote loopback and other methods. With such remote testing, many diagnostic nightmares disappear, including the task of figuring out which vendor to blame for transmission problems. Is it the modem manufacturer, the local telephone company, the long-distance carrier, the remote telephone company or the software? With end-to-end diagnostics, users can now test their own lines and determine for themselves where the problem lies.

Some of the newer intelligent dial-up modems will work on both leased lines and dial-up circuits. If the leased-line quality drops below a certain threshold, the data is transferred automatically to a dial circuit, initiating an alarm in the process. This introduces more possibilities than just security. Users gain the flexibility of implementing least-cost routing schemes, using dial-up lines as overflow when leased channels are full or using leased lines and dial-up interchangeably, depending on the cost and demands of the application.

Digital media and modems

The possibilities — and problems — raised by the arrival of digital media are legion. What will become of modems in a digital environment?

Traditional low- and medium-speed modems will still probably be the preferred solution for "final-mile" applications to connect a distant remote terminal to the network. In fact, analog modems will be necessary parts of data communication until such time as the phone network is completely digital — an event not likely to happen for several decades, if ever. The low cost and large existing base of traditional analog technology will also give modems a secure future in portable data communications.

> THE possibilities — and problems — raised by the arrival of digital media are legion. What will become of modems in a digital environment?

One particular application in which analog modems are likely to remain dominant is videotex, or analog dataphone service. Regulatory developments in Washington, D.C., favor the passage of Computer Inquiry III, the Justice Department resolution that would allow the divested Bell operating companies to sell equipment and long-distance and information services. This promises to pave the way for operating company-sponsored data services, giving videotex the official sanctioning it has heretofore lacked.

In the longer term, a high-speed digital telephone network such as the ISDN will ultimately require digital network interfaces in the place of modems; in the meantime, videotex will become an increasingly popular way of recycling analog telephone networks.

The wholesale conversion of the public network to digital will create a huge market for analog-to-digital protocol conversion devices, that is, protocol-converting modems. It is through these devices that small analog networks or "islands" will communicate with the digital infrastructure.

Standard modems and personal computers can already connect users with computer data base services from Copenhagen to Columbus.

In these centers, the PC revolution puts demands on MIS to handle the greatly increased requests for mainframe data. Higher speed intelligent modems are needed to handle this kind of load, not only with synchronous connections, but also with asynchronous, dial-up traffic.

Tandem Computer, Inc.'s own data network connects 180 different data centers all over the world and processes more than a billion transactions per second, according to Kirby Wadsworth, a systems analyst at the firm's Newton, Mass., office. But the high-speed dial-up modem accelerator from Telcor Systems has given Tandem a new potency in hiring outside software design consultants.

Typically, Tandem invites outside developers to one of its 17 design centers nationwide. There, the developers can use a Tandem Nonstop computer to develop code for the Tandem machines. Now, according to Wadsworth, the company is equipping its design machines with the Telcor Systems Accelerator units along with 9.6K bit/sec. dial-up modems. When the system is complete, developers will be able to dial in from their own offices and gain access to Nonstops for development. At 38.4K bit/sec., developers will get the same — or faster — response time than if they were in Tandem's office.

Convenience is not the only advantage this plan offers. It will also make it possible for Tandem to hire design teams that normally couldn't make it to one of the design centers — increasing the pool of talent the company can draw on to produce all-important software for its Nonstop-series computers.

The newer, superhigh-speed dial-up modems are even giving leased lines a run for their money. Mike Miller, an engineer at A. C. Nielsen Co., the television ratings organization, set up a multipoint data collection system using Telebit's 18K bit/sec. modems. "We've got 15 data collection points around the country," Miller says. "Leased lines are expensive, and with fast modems it takes about 10 minutes to send the data from each site. . . . We wrote our own internal communications software using [Lattice, Inc.'s] Lattice C with the [Greenleaf Software, Inc.] Greenleaf communications library."

In the Nielsen setup, computers monitor television signals, and a pattern-recognition program identifies the advertisements the company is tracking. The ad's identification number and the time, date and broadcasting station identification are added to a local data base, and all information is sent daily to a central site.

Nielsen's system illustrates how improved modem technology circumvents limits in transmission media — in this case, the low quality of the public network and the high cost of leased lines. Miller trusts the tried and true: "We looked at leased lines, and they weren't really effective for our needs," he says. "At this point we're satisfied with the Telebits. I think people using leased lines may be a little reluctant to switch to the new technology. People exploring new technologies might consider these high-speed modems."

The utility of modems extends beyond mere data transfer. Protocol-converting modems such as those from Digital Communications Associates, Inc. or Ideassociates, Inc. provide an inexpensive way for corporate PC users to access mainframe data resources without the costly option of expanding the corporate data network.

VM Personal Computing, Inc., a Danbury, Conn., software development firm, even has a communications program that allows IBM 3270 terminal emulation using regular dial-up modems simply by running the company's personal computer package in conjunction with its mainframe software.

Modems can also be used to solve compatibility problems between competing data formats. Transmitting asynchronous ASCII text by modem is still the easiest way to transport files between incompatible word processing systems and computer architectures. Synchronous data streams, moving at much higher rates, can also provide channels between incompatible environments; but these solutions are

Continued on page S5

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DIAL-INQ READER SERVICE NUMBER 35

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Please note: You will be asked to use the "star" (*) and the "pound" (#) symbols on your touch-tone telephone set during your telephone call.

4. When prompted by the recording, enter your DIAL-INQ subscriber code and symbols as recorded below.

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2. ☐ ☐ ☐ # #
3. ☐ ☐ ☐ # #
4. ☐ ☐ ☐ # #
5. ☐ ☐ ☐ # #
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Reader response service

Frontiers

FROM PAGE S3

generally more expensive and frequently require protocol conversion.

As PC users become more sophisticated, the applications for modems — and the modems they use — will change drastically. For example, higher speed modems in the 2,400 to 9.6K bit/sec. range are creating more applications for larger data transfers and, for the first time, are making it economical to use modems to send large data bases over very long distances. Transaction processing can be used for applications that require greater amounts of data transfer; instead of sending limited data on the line, terminals can download entire account histories or data that would have been too costly or time-consuming to send before. Local-area network (LAN) gateways can be set up at either end of a leased or dial-up line, giving remote users access to the LAN.

As the features of bank automated teller machines become more sophisticated, the data traffic between the mainframe and the ATM will demand faster modems. As the ATM concept evolves into remote banking, faster modems with data encryption capabilities will become essential parts of electronic financial services.

High-speed modems also open up new opportunities in distributed systems. As networks are increasingly used to link office and factory, home and office — and office and office — modems become the linchpin in any company's networking strategy.

Modems are already established as essential devices in multivendor office automation. But the single most important asset of modem technology is its strict adherence — by necessity — to Bell and CCITT standards. The IBM Personal Computer went a long way toward bringing the same solid standards to office automation, but workstations in general have a long way to go. The reliance on standards in modems ensures that multivendor communications, even if difficult, will never be impossible.

Increased use of packet networks, especially on a local basis, suggests the rise of protocol-converting modems. Packet protocols such as CCITT's X.25 are only the beginning of what could be a booming new modem market. IBM Systems Network Architecture, Manufacturing Automation Protocol and the International Standards Organization's Open Systems Interconnect protocol are all likely candidates for protocol-converting modems.

The evolving network

As the telephone network evolves toward a digital local loop that will run a digital line to every telephone company customer's premises, the use of modems is going to be affected: More digital modems or DSU/CSUs will be used to provide the customer interface to a digital line. While today's phone network provides digital lines only to leased-line customers, tomorrow's phone network will offer switched, digital end-to-end connections.

The central-office LAN being marketed by several divested Bell operating companies provides a preview of tomorrow's modem uses. This product gives the customer a digital subscriber line along with a Centrex-like semiprivate networking scheme. Central-office LAN customers use the service to send data on a citywide basis.

Telephone companies' increasing use of fiber transmission paths will also affect modem and modem-related purchasing over the next several years. Higher volume customers will have the option of choosing a fiber connection to the central office. These customers will want optical interface units to connect them to the digital optical network.

Fiber is able to take much higher data rates than even T1 service; consequently the kinds of data applications used for fiber will change, and there will be an increasing need for multiplexing.

Toward a digital world

If Computer Inquiry III makes it through the Justice Department — as seems likely in the light of recent recommendations made to U.S. District Court Judge Harold H. Greene — ISDN will offer users a larger bandwidth alternative to DDS, with the same cost advantages and many more features.

Access to ISDN won't change anyone's desktop: There will still be a box that looks a lot like a modem or a card inside the PC with regular phone lines attached. Those lines, however, will carry voice, data and video, promising to bring data communications up to par with the current state of the art in data processing.

Like every other network architecture, ISDN has more to do with protocols than equipment. Yet, rumors already abound of a Hayes Microcomputer Products, Inc. ISDN interface card for PCs, and several vendors, including Fujitsu America, Inc., Northern Telecom, Inc. and AT&T, have shown NT1 ISDN interface units at trade shows. Product details are still fuzzy, but it is clear at this point that ISDN has more substance than the government's Strategic Defense Initiative.

If some system integrators have their way, the future digital network might mean the end of the modem as we know it. Just as many laptop personal computers supply built-in modems, integrated ISDN access circuitry may become as matter-of-course as a serial port. It may also come with options from network vendors and phone companies to have all the functions provided by the central office, without the need for any premises equipment. •

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DIAL-INQ READER SERVICE NUMBER 36

PRODUCT FACE-OFF

Fastcomm vs. U.S. Robotics: Different strokes at 9.6K bit/sec.

BY STEPHEN SATCHELL

The ideal for high-speed modems — those designed to transfer data at 9.6K bit/sec. or more — is fast and error-free transmission, regardless of the quality of telephone connection, combined with the ability to communicate with lower speed modems that adhere to industry standards such as Bell 103, Bell 212A, CCITT V.22 and CCITT V.22bis. Support of the industry-standard AT command set pioneered by Hayes Microcomputer Products, Inc. is also desirable, since it ensures that users and existing telecommunications software can work with the modem.

U.S. Robotics, Inc. and Fastcomm Data Corp. are two major manufacturers whose products go a long way toward satisfying these conditions, although their approaches differ significantly.

The U.S. Robotics High-Speed Technology (HST) modem uses proprietary technology throughout. Fastcomm Data, a subsidiary of Electronic Vault, Inc., makes use of international standards, sweetened with enabling protocols in its Fastcomm 2496. Both modems are designed to be used with asynchronous interfaces and employ supersets of the basic AT modem command set.

Connections good and bad

Unlike modems designed for leased-line operation, those used on switched networks must be able to handle a wide variation of connection quality, from perfect to just awful.

The Fastcomm 2496, which its maker claims has a top speed of 850 char./sec., uses a large in-modem buffer and a streaming protocol with a standard — V.29 — 9.6K bit/sec. half-duplex connection to achieve this high throughput rate.

At the modem-to-modem link level, the 2496 transparently falls back to either 7.2K or 4.8K bit/sec. When the connection improves, the modem can shift to a faster rate in order to take advantage of the more favorable conditions.

The Ensured Data Integrity protocol (EDI), developed by Fastcomm's parent company and used in the Fastcomm 2496, transmits more than 2,800 bytes in a burst before requiring the modems to turn the line around. This minimizes the effect of the rather long turnaround time required by 9.6K bit/sec. on the switched network. EDI also makes smarter use of the channel by requesting only those packets not received correctly.

U.S. Robotics chose a different route for its HST modem. Instead of one channel that is switched constantly, the HST has a 9.6K bit/sec. main channel and a 300 bit/sec. reverse channel. Since the modem does not have to switch directions in bulk transfer, it is capable of transferring 1,100 char./sec.

According to U.S. Robotics, the trellis-coded modulation (TCM) technique used with the HST is more robust than the quadrature amplitude modulation used in the 2496 and other modems. If the HST encounters a less-than-ideal connection, it does not have an automatic fall-back rate to decrease the number of packets retransmitted.

Because the asynchronous high-speed stand-alone modem is a comparative newcomer to the market, almost none of the high-speed modems can talk to another brand.

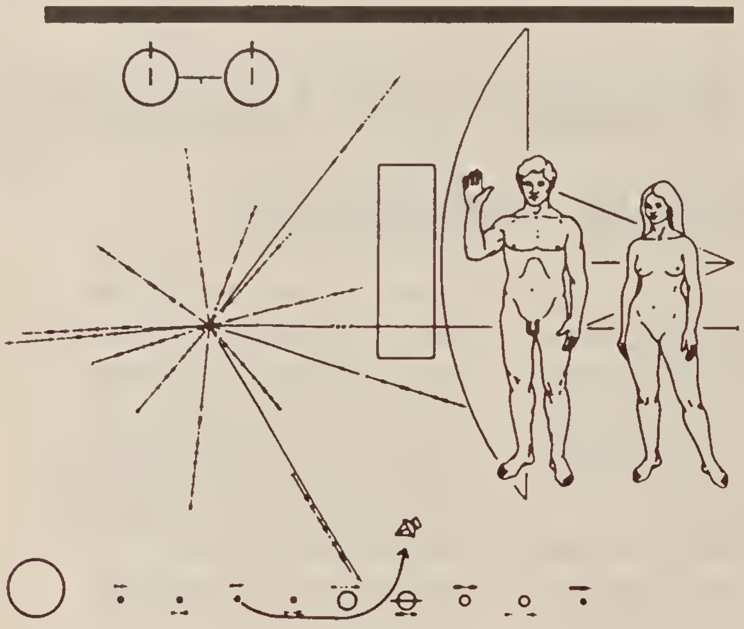
Even though the 2496 uses V.29 signaling, the EDI protocol is unique to Electronic Vault and Fastcomm products. The HST uses TCM, but it does not follow the V.32 recommendation.

Both U.S. Robotics and Fastcomm claim compatibility with modems that support Bell 103 for 0 to 300 bit/sec., Bell 212 for 1,200 bit/sec. and CCITT V.22bis for 2,400 bit/sec.

Both modems are compatible with modems of their own kind and with 300, 1,200 and 2,400 bit/sec. modems in Answer and Originate mode. You can thus upgrade incrementally without installing new lines, ports or access numbers as long as you do not need to support high-speed modems from multiple vendors. U.S. Robotics has an extra edge in compatibility — 1,200 and 2,400 bit/sec. Microcom Network Protocol support.

The difference in price between these products is insignificant: The Fastcomm is priced at $999 in a stand-alone configuration; the U.S. Robotics HST at $995. Currently, the HST is available only in stand-alone mode, while the 2496 is also available in a rack-mount and IBM Personal Computer half-card configuration. •

Satchell is a free-lance writer and owner of Satchell Evaluation, a microcomputer product evaluation firm in Morristown, N.J.



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Drawing is from the plaque on the Pioneer spacecraft. 6 by 9 inches, gold anodized aluminum. Courtesy of NASA.

Trademark acknowledgement: Dow Jones & Co. (Dow Jones News/Retrieval), CompuServe Inc. (CompuServe), Mead Data Central (LEXIS/NEXIS), Tymshare Inc. (Tymnet), GTE (Telenet), Digital Equipment Corp. (VAX), International Business Machines, Inc. (IBM)

DIAL-INQ READER SERVICE NUMBER 37

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DIAL-INQ READER SERVICE NUMBER 38

Paring down the phone bill with fiber-optics

BY DONNA RAIMONDI

A fiber-optic network will save Sutter Health Systems, a Sacramento, Calif., hospital complex, from $30 million to $40 million in the next 20 to 30 years, primarily in leased digital-service lines, according to Binda Mangat, the hospital's telecommunications director.

Sutter's fiber-optic network ties four buildings and supports IBM's Systems Network Architecture, Rolm Corp.'s CBXII private-branch exchange running at 295M bit/sec., a centralized Digital Equipment Corp. VAX laboratory installation and an NBI, Inc. computer installation. The IBM 3081 and the VAX-11/750 reside in the complex's data center, while the NBI is located in one of the hospitals.

"The IBM and the VAX we are feeding from the data center out to the hospitals and the physicians' building. The NBI is coming from one hospital and going to the other on fiber," Mangat explains. In essence, he says, "We are making two systems look like one, although they are four miles apart. For that purpose, we are using T1 multiplexers, which are a combination of fiber-optic modems and multiplexers. We chose the fiber-optic modem/multiplexers because they are the most cost-effective and very reliable."

Fiber-optic modems, which are used only with fiber-optic cable, convert the electrical signals from data peripherals to optical light pulses. Data conversion on traditional analog-to-digital modems is handled within the unit, Mangat explains. With fiber-optic modems, there is no data conversion, just the conversion of electrical to optical signals.

Depending on cable size, data can be sent across distances of up to three kilometers. The transmission speed can vary from 19.2K bit/sec. to T2 speeds, which can reach as much as 7M bit/sec. Portions of Sutter's networks transmit at different speeds.

Mangat says he has had good luck with the fiber system. "But," he says, "it is still an unproven technology we are looking at, so I don't know what the mean time between failure will be." Not enough statistics are available yet to determine failure rates.

Fiber-optic modems are not as sophisticated as traditional modems in features such as diagnostic detection and built-in testing, but that is not necessarily a problem, according to Mangat. "They either work or they don't," he says, and up to this point, he claims, they have worked very well. "The bit error rate has been excellent," Mangat testifies, "and we haven't had any failures."

Fiber-optic networks do have some drawbacks, Mangat says, such as the expenses involved if the company does not own the property on which its buildings sit.

Mangat says he found that while his vendors cooperated and were always available to talk, the project still required putting together a lot of heads to work things out. "An example of that would be handshaking protocols," he says. "Different systems require different protocols, so you have to be sure the company whose equipment you buy can handle that."

Despite the amount of work involved, Mangat is bullish on fiber-optic transmission. "I think fiber modems and fiber multiplexers will become so common a year from now that we will look back and say, 'Why did we even bother to talk about that?' " •

Raimondi is a senior writer for *Computerworld.*

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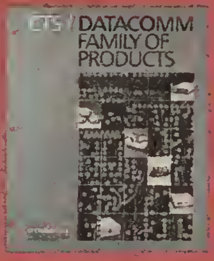

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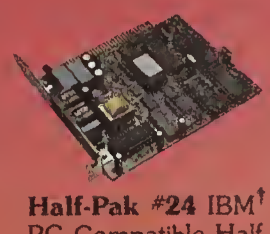
Universal Rack Holds Sixteen Modems—1200, 2400 bps/Intermixed



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2424ADH Hayes Command Set Compatible 2400 bps Modem

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DIAL-INQ READER SERVICE NUMBER 39

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DIAL-INQ READER SERVICE NUMBER 40

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

What, if any, new technology is Codex using to replace the old LSI 9.6K bit/sec. dial backup modem?

John Malone
Network systems engineer
Sunguard Recovery Services
Wayne, Pa.

CODEX CORP.: There have been several important technological advances in modems in the past several years, particularly in the area of restoral.

For example, Codex's 2600 series, which is the new-generation high-speed leased-line modem, includes a feature called Enhanced Dual Dial Restoral (EDDR). EDDR automatically senses when the line goes down, switches from the leased line to dial, periodically checks the condition of the leased line and automatically returns to leased-line operation when the line service is restored.

CCITT V.32 modems, such as Codex's 2250 and 2260 series allow two-wire full-duplex 9.6K bit/sec. transmission over dial or leased lines. The 2250 and 2260 series can be used as a primary connection via dial lines for applications for which dial-up is more economical; it can also be used for restoral of leased lines over a single dial line. Codex's V.32 modems are fully compliant with the CCITT recommendation and are trellis-coded at 9.6K bit/sec. They are nestable and have integral autocall units.

We use a Fujitsu 1921L modem. Is this model still being manufactured by Fujitsu? If we wanted to upgrade, what models are available that are compatible with the 1921L?

Wallace Jones
Data processing manager
National Fruit Product Co.
Winchester, Va.

FUJITSU AMERICA, INC.: Fujitsu continues to manufacture the 1921L modem. The next step up from a Fujitsu 1921L would be the Fujitsu 1927L at 14.4K bit/sec. If your requirements for faster data transmission have increased, you probably would find that a new product like the 1927L would meet your needs.

We are using Fujitsu M1921L modems in a network that includes another vendor's T1 management system.

This system includes interface-controlled loopback capabilities, but because the M1921L modems do not support these capabilities, we cannot use them to the extent we would like. Does Fujitsu plan to provide support for diagnostic functions in a future release of this modem?

Christopher Hobbs
Network operations
Boeing Computer Services Co.
Seattle

FUJITSU AMERICA, INC.: The trend in modem design today is to provide more and more diagnostic features for the end user. Although we cannot offer specifics on our future development, Fujitsu is always seriously looking at features that will better meet end-user needs in the next generation of modems.

Can eight-wire, flat cable be used for a synchronous local modem application for two circuits over a distance of 300 ft and operating at 9.6K bit/sec?

Dale Osborne
Manager of computer studies
Asea Power Systems, Inc.
New Berlin, Wisc.

GANDALF DATA, INC.: Yes, assuming use of twisted-pair, this application should present no problems, regardless of whether it is synchronous or asynchronous. Because of the limited distance involved, there would be no crosstalk problem.

We at Sheraton use your asynchronous error-protection modems. There has been much discussion and confusion about error-protection protocols in the past year. We understand that there is an effort under way in the CCITT to select a standard. What is Concord Data System's position relative to conformance to any emerging standard?

Jonathan Chinitz
Assistant manager,
Unix Development Group
Sheraton Corp.
Braintree, Mass.

CONCORD DATA SYSTEMS, INC.: Concord Data Systems' policy is to provide products that conform to international standards when applicable, de facto standards when appropriate and proprietary solutions when no standards exist or when implementing a standard results in poor performance. In this way, we expect to continue to provide the widest variety of protocol support for our customers. •

Universal Data Systems, the company that developed the first 9600 bps dial-up modem, has now applied its special brand of craftsmanship to the CCITT V.32 specification.

The result is a *full-duplex* 9600 bps device for the switched telephone network. When substandard line conditions are encountered, the device offers automatic fallback to 4800 bps, while maintaining the full-duplex communications capability.

As you expect from UDS, the device fully utilizes the latest in CMOS technology for low-noise performance and very low (less than 20W) power consumption. A new LCD control panel displays and configures modem set-up selections and displays outputs from the unit's comprehensive self-test regime. Auto-dial capability is also included.

If your system must accommodate periodic bursts of high-throughput, full-duplex communication, UDS craftsmanship and the V.32 standard provide a reliable, cost-effective solution. For complete technical details and quantity prices, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/721-8000; Telex 752602 UDS HTV.

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DIAL-INQ READER SERVICE NUMBER 41

VENDOR VIEWPOINT

When standard means 'average'

BY HERB HENSLEY

Standards are intended to provide uniformity, compatibility and security. However, in data communications, different vendors' interpretations of standards published by various governing bodies have produced a myriad of incompatible "standard" products.

There is no national agency in the U.S. empowered to establish modem standards or tests for compatibility. In most countries, "the" phone company is a government-controlled monopoly, and the buying public relies on it for telecommunications compatibility. AT&T used to be "the" phone company for all practical purposes, which is why the older, slower Bell-compatible 103 and 212A modems are, for the most part, standard.

Today, however, it is the Consultative Committee on International Telephony and Telegraphy (CCITT), a United Nations-chartered international standards body, that recommends such essential items as interfaces and modulation techniques. The CCITT has issued standards, such as V.22, that most U.S. manufacturers follow. But the existence of standards is no guarantee of compatibility.

When the CCITT V.32 modems hit the market, the Concord Data Systems, Inc. V.32 and Codex Corp. V.32 modems reportedly did not work together, even though both claimed V.32 compatibility.

Then there is a question of applicability. While some of the new CCITT standards specifying V.32 trellis-coded modulation with echo cancellation may result in excellent full-duplex modems for small European countries where very long-distance connections are rare, they could prove too unreliable and expensive to implement in the U.S.

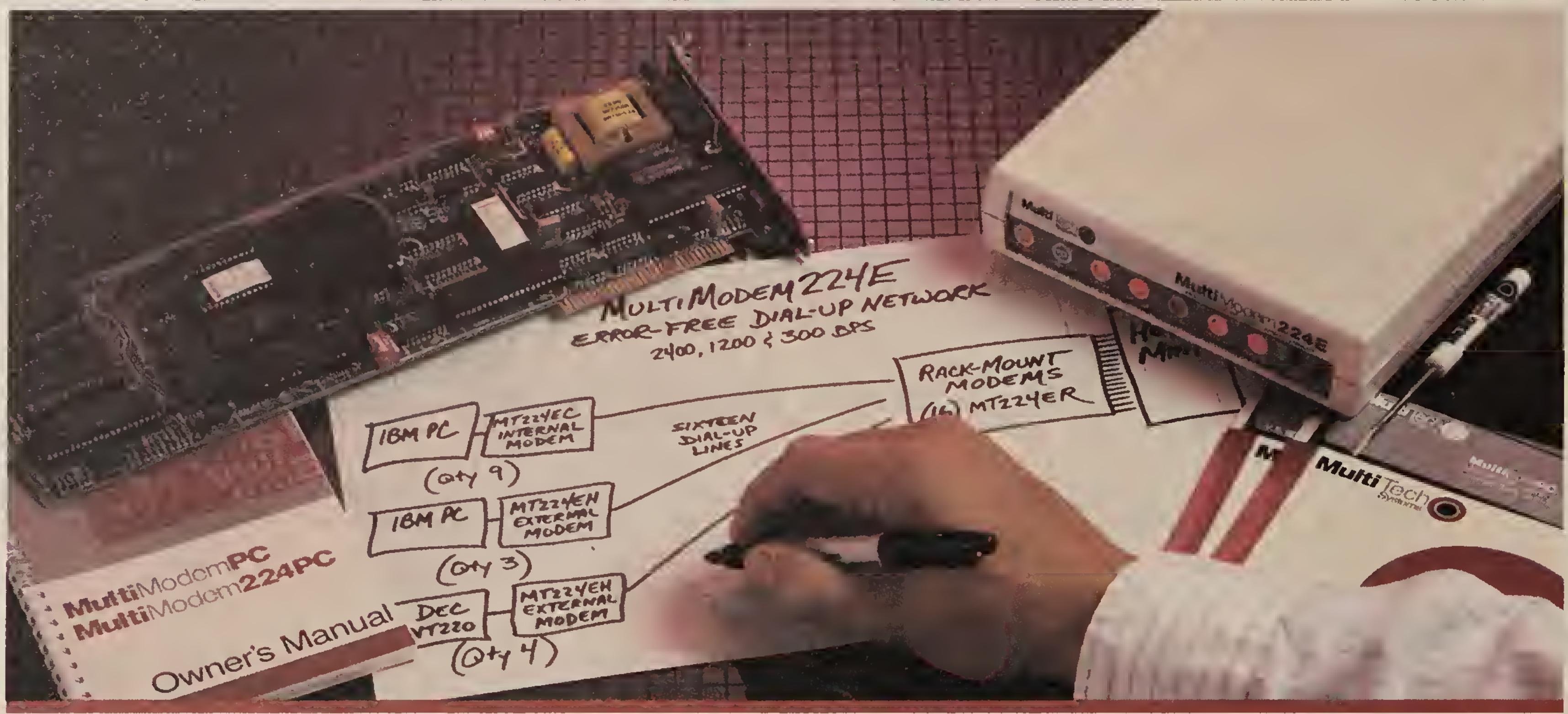
The effective use of computers to process data, text, graphics and office functions relies heavily on interconnectivity at higher speeds on existing public telephone networks. However, the low-cost workstations used for this purpose employ asynchronous serial data streams and possess little or no ability to support sophisticated protocols.

To cost-effectively connect high-performance workstations requires that a modem possess the intelligence to perform sophisticated error correction. This means it must embody functions such as data compression, error control, flow control and protocol conversion.

Modems capable of performing these tasks are available, but no CCITT or Bell standards exist for these functions. Because standards evolve so slowly and lag behind the leading edge of development, many data communications users adopt what they need and let the standards follow.

In some environments, it is common to find data communications products like modems or multiplexers that have been tailored to resolve interface problems. It is a case of using the available technology to solve real problems that the standards do not even recognize. •

Hensley is president of Data Race, Inc. in San Antonio, a developer of high-speed modems.



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- That's why our MultiModem224E™ offers MNP™ error correction. Available in our 2400 bps desktop, internal and rack-mounted modems, MNP gives you 100% error-free transmissions, no matter how bad the phone line. MNP does it without the speed degradation of less efficient, software-based protocols.
- Another important point: MNP Class 3 has emerged as an industry standard. It's now in the public domain, and has been implemented in virtually all 2400 bps modems that offer error-correction.
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Digital modems

COMPANY	PRODUCT	SINGLE UNIT, DSU/CSU OR COMBINATION	SERIAL OR SYNCHRONOUS	COMMUNICATIONS MEDIUM	INTERFACES TO	TRANSMISSION RATES	PROTOCOLS SUPPORTED	CCITT STANDARD	NETWORK CONTROL	PERFORMANCE MEASUREMENT	SIDEBAND DIAGNOSTIC TESTING	ELECTRICAL POWER REQUIREMENTS	TEMPERATURE REQUIREMENTS	PRICE	DIAL-INQ READER SERVICE NUMBER
Amdahl Communications Systems Division (408) 746-6000	DSU II 96	DSU with secondary channels	Synchronous	Any digital data system with secondary channels	RS-232	9.6 bit/sec. primary, up to 300 bit/sec. secondary	All	NA	No	No	Yes	115V, 12W	0 -50 C	$1,050	825
	DSU II 56	DSU with secondary channels	Synchronous	Any digital data system with secondary channels	RS-232	56K bit/sec. primary, 24K bit/sec. secondary	All	NA	No	No	Yes	115V, 12W	0 -50 C	$1,350	
Applied Spectrum Technologies, Inc. (612) 379-7114	DVM-400	NA	Synchronous, asynchronous	Two-wire, twisted-pair phone lines	RS-232, V.24, V.28	Up to 19.2K bit/sec.	All	V.24, V.28	Yes	No	Yes	115V ac, 48V dc	0 -50 C	$270-$330	826
	ECON	NA	Synchronous, asynchronous	Two-wire, twisted-pair phone lines	RS-232, V.24, V.28	Up to 19.2K bit/sec.	All	V.24, V.28	Yes	No	Yes	115V ac, 48V dc	0 -50 C	$176-$225	
Astrocom Corp. (612) 227-8651	EQL 2000	NA	Synchronous	Short-haul, twisted-pair phone lines	Any synchronous device	Up to 19.2K bit/sec.	All	V.24	Yes	No	Yes	110V, 220V, 66Hz	0 -50 C	$695	827
	SH series	NA	NA	Short-haul, asynchronous	Any asynchronous device	Up to 19.2K bit/sec.	All	V.24	No	No	No	110V, 220V, 66Hz	0 -50 C	$295	
AT&T Information Systems (201) 898-3278	Dataphone II 2500-series DSU	Combination	Synchronous	AT&T Dataphone Digital Service	RS-232C, local-area data set, point-to-point	Up to 56K bit/sec.	AT&T Dataphone Digital Service	V.35	Yes	—	Yes	105V, 129V, 51Hz, 63Hz	150 F	Contact vendor	828
	Dataphone II 2600-series DSU	Combination	Synchronous	AT&T Dataphone Digital Service, DCD	RS-232C, local-area data set, multipoint	Up to 56K bit/sec.	AT&T Dataphone Digital Service, DCD	V.35	Yes	—	Yes	105V, 129V, 57Hz, 63Hz	150 F	Contact vendor	
	Dataphone II, 2700-series DSU	Combination	—	AT&T Dataphone Digital Service, DCD	Multipoint, point-to-point	Up to 56K bit/sec., except multipoint	AT&T Dataphone Digital Service, DCD	V.35	Yes	—	Yes	—	—	Contact vendor	
Avanti Communications Corp. (401) 849-4660	Accupac-1.5	Combination (DFU/CFU)	Synchronous	T1	T1 ports	1.544M bit/sec.	All	T1	No	No	No	115V, 230V, 48W	0 -40 C	$3,995-$4,495	829
	Tpac-1.5	Combination (DFU/CFU)	Synchronous	T1	T1 ports	1.544M bit/sec.	All	T1	Yes	Included in product	Yes	115V, 230V, 48W	0 -40 C	$8,000	
Burr-Brown Corp. (602) 746-1111	LDM70	NA	Serial	Hardwire	RS-232 serial CPU ports	57K bit/sec.	All	V.24	Yes	—	No	110V ac, 1.5W	0 -70 C	$107	830
	LDM422	NA	Serial	Hardwire	RS-232, RS-422/485 multipoint	19.2K bit/sec.	All	—	Yes	—	No	110V ac, 1.5W	0 -70 C	$132	
	LDM35	NA	Serial	Hardwire	RS-232, RS-422/485 multipoint	19.2K bit/sec.	All	—	Yes	—	No	110V ac, 1.5W	0 -70 C	$83	
Case Communications, Inc. (301) 290-7710	Model 500A	Combination	Serial	AT&T Dataphone Digital Service	RS-232 synchronous	2,400, 4.8K, 9.6K bit/sec.	All synchronous	V.24	No	No	No	115V, 12W, 47Hz, 63Hz	0 -40 C	$799	831
	Model 500A/56	Combination	Serial	AT&T Dataphone Digital Service	RS-232 or V.35 synchronous units	Up to 56K bit/sec.	All synchronous	V.35	No	No	No	115V ac, 12W, 57Hz, 63Hz	0 -40 C	$995	
C-Cor Electronics, Inc. (800) 233-2267	Model 7130	CSU	Serial	Broadband LAN	RS-232	Up to 19.2K bit/sec.	All	V.24	No	No	No	110V, 240V	0 -40 C	$750	832
	Model 7140	CSU	Serial	Broadband LAN	RS-232	Up to 9.6K bit/sec.	All	V.24	No	No	No	110V, 240V	0 -40 C	$780	
Codex Corp. (617) 364-2000	Model 2131	Combination	Serial	AT&T Dataphone Digital Service	RS-232C	Up to 9.6K bit/sec.	All	NA	No	No	No	117V ac, 57Hz, 63Hz	0°-50°C	$100-$1,100	833
	Model 2132	Combination	Serial	AT&T Dataphone Digital Service	V.35	Up to 56K bit/sec.	All	V.35	No	No	No	117V ac, 57Hz, 63Hz	0°-50 C	$100-$1,100	
Data Race, Inc. (512) 692-3909	Race 1	NA	Serial	AT&T Dataphone Digital Service, public switched telephone network	Any asynchronous ASCII-based hardware	4.8K bit/sec.	Proprietary	V.27	No	—	No	120V ac, 30W	0 -45 C	$1,495	834
	Race AF	NA	Serial	AT&T Dataphone Digital Service, public switched telephone network	Any asynchronous ASCII-based hardware	4.8K bit/sec.	AT&T 212A	V.22	No	—	No	120V ac, 30W	0 -45 C	$1,695	
	Race BMX	NA	Serial	AT&T Dataphone Digital Service, public switched telephone network	Any asynchronous ASCII-based hardware	9.6K bit/sec., half-duplex	Proprietary	—	No	—	No	120V ac, 30W	0 -45 C	$1,195	
Dataradio, Inc. (404) 728-0012	Asynchronous radio modem	NA	Serial	Radio	RS-232	4.8K, 9.6K bit/sec.	CSMA	X.3	NA	No	NA	110V, 220V	30 -60 C	$3,000	835
	Synchronous radio modem	NA	Serial	Radio	RS-232	4.8K, 9.6K bit/sec.	CSMA	X.3	NA	No	NA	110V, 220V	30 -60 C	$3,000	
Datatel, Inc. (609) 424-4451	DCP 3080 series	Combination	Synchronous	Point-to-point and multidrop AT&T Dataphone Digital Service	RS-232, RS-422	Up to 56K bit/sec.	AT&T	V.35	No	DCP 3800	Yes	110V	0 -50 C	$735	836

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	SINGLE UNIT, DSU/CSU OR COMBINATION	SERIAL OR SYNCHRONOUS	COMMUNICATIONS MEDIUM	INTERFACES TO	TRANSMISSION RATES	PROTOCOLS SUPPORTED	CCITT STANDARD	NETWORK CONTROL	PERFORMANCE MEASUREMENT	SIDEBAND DIAGNOSTIC TESTING	ELECTRICAL POWER REQUIREMENTS	TEMPERATURE REQUIREMENTS	PRICE	DIAL-INQ READER SERVICE NUMBER
DEI-Teleproducts (619) 743-8344	Model 1300	Combination	Serial	AT&T Dataphone Digital Service	Any synchronous terminal equipment	2,400, 4.8K, 9.6K bit/sec.	All	—	No	No	No	115V, 50Hz, 60Hz	30 -50 C	$675	837
Digital Communications Associates, Inc. (800) 241-IRMA	DSU-A	Combination	Serial	Four-wire AT&T Dataphone Digital Service	RS-232C, RS-449, V.35, data terminal equipment	19.2K bit/sec. asynchronous, up to 56K bit/sec. synchronous	Asynchronous, synchronous	V.35	No	No	No	115V ac, 14.4W	0 -50 C	$875-$1,095	838
	T1 CSU	CSU	Synchronous	T1	T1 ports	1.544M bit/sec.	T1	NA	No	No	No	-48V dc, +130V dc in-ground	0 -60 C	Contact vendor	
Fairchild Data Corp. (602) 949-1155	SM 220	CSU	Serial	Satellite	Head-end office equipment	56K bit/sec., 2.048M bit/sec.	T1, MIL-188-144, TTL, CEPT	V.35	Yes	—	Yes	110V, 220V, -48V dc	To 40 C	$14,400	839
	SM 280	DSU	Serial	Satellite	Head-end office equipment	56K bit/sec.	RS-232 asynchronous	V.35	No	—	Yes	110V, 220V	To 40 C	$4,900	
	GB-200	NA	Synchronous	Microwave	Frequency division multiplexer	Up to 216K bit/sec.	V.35	V.35, V.36, V.37	No	—	Yes	115V, 2,309V ac, 24V, 48V dc	To 40 C	$14,400-$15,600	
	M 505	NA	Both	Broadband, microwave	Frequency division multiplexer, broadband cable	56K bit/sec., 8M bit/sec.	All	V.35	NA	NA	NA	115V, 230V ac, 24V, 48V dc	To 40 C	$4,750-$5,600	
	MAP-Link M8024	NA	Serial	Broadband	Head-end or modulator	10M bit/sec.	IEEE 802.4	—	Yes	—	Yes	—	0 -70 C	Contact vendor	
General Data Comm, Inc. (203) 574-1118	Datacomm 500A/SR	Combination	Serial	Synchronous AT&T Dataphone Digital Service	RS-232	2,400, 4.8K, 9.6K bit/sec.	All	V.24	Yes	—	No	117V, 10W	0 -50 C	$725	840
	Datacomm 500A/56K	Combination	Serial	AT&T Dataphone Digital Service	RS-422	56K bit/sec.	All	V.35	Yes	—	No	117V, 10W	0 -50 C	$825	
	Digi-Dial/56K	Combination (T1D)	Synchronous	Accunet switched 56	Any V.35 terminal port	56K bit/sec.	All	V.35	No	—	No	117V, 10W	0 -50 C	$2,360	
	CSU 551A/S1	CSU	Synchronous	T1	Any DS1 interface	1.5M bit/sec.	DS1 transmission	NA	No	—	No	117V, 10W	0 -50 C	$1,995	
	Datacomm 2020/2030	NA	Synchronous	Short-haul	RS-232, RS-422, V.35	Up to 64K bit/sec.	All	V.35	Yes	—	Yes	117V, 10W	0 -50 C	$695-$850	
Infinet, Inc. (617) 681-0600	IDM 500	Combination	Both	Point-to-point	Data terminal equipment	2,400, 4.8K, 9.6K bit/sec.	EBCDIC, ASCII, SDLC	V.24, V.28	Yes	EMS-2	Yes	110V ac, 60Hz	0 -50 C	$1,795-$1,895	841
	IDM 556	Combination	Both	Point-to-point	Data terminal equipment	56K bit/sec.	EBCDIC, ASCII, SDLC	V.35	Yes	EMS-2	Yes	110V ac, 60Hz	0 -50 C	$1,895-$1,995	
Infotron Systems Corp. (609) 424-9400	INM 50	Combination	Synchronous	AT&T Dataphone Digital Service, private four-wire lines	CPUs, front-end processors, cluster controllers	Up to 56K bit/sec.	All	V.24, V.28	Yes	Yes	Yes	110V, 60Hz	0 -50 C	$1,895	842
	INM 56	Combination	Synchronous	AT&T Dataphone Digital Service, private four-wire lines	CPUs, front-end processors, cluster controllers	Up to 56K bit/sec.	All	V.35	Yes	Yes	Yes	110V, 60Hz	0 -50 C	$1,995	
ITT Corp. (919) 872-3359	DSU-A	DSU	Synchronous	AT&T Dataphone Digital Service	RS-232, RS-449	Up to 56K bit/sec., selectable rate	All	V.35	No	No	No	115V	0 -50 C	$695-$880	843
Kentrox Industries (800) 824-4510	T-Serv	CSU	NA	T1	T1 equipment at DSX-1	1.544M bit/sec.	T1	NA	No	No	No	60 milliamps, 20V, 56V dc	0 -50 C	$1,350	844
Micom Systems, Inc. (805) 583-8600	M4950	Combination	—	Twisted-pair	AT&T Dataphone Digital Service	2,400, 4.8K, 9.6K bit/sec.	AT&T Dataphone Digital Service	NA	Yes	No	No	100V, 127V ac, 56Hz, 63Hz, 9W	0 -45 C	$725	845
	M4350	NA	—	Twisted-pair	AT&T Dataphone Digital Service	2,400, 4.8K, 9.6K bit/sec.	AT&T Dataphone Digital Service	NA	Yes	No	No	100V, 127V ac, 56Hz, 63Hz, 9W	0 -45 C	$675	
NEC America, Inc. (516) 753-7000	N500ADSV	Combination	Serial	AT&T Dataphone Digital Service, nonloaded copper lines	Synchronous data terminal equipment, multiplexers, asynchronous controllers, protocol converters	Up to 56K bit/sec.	Isochronous BSC, SDLC/HDLC	V.24, V.28, V.35	No	No	No	117V ac, 60Hz, 13W	—	$695-$795	846
Paradyne Corp. (800) 482-3333	3056/BSU	Combination	Both	AT&T Dataphone Digital Service, limited distance manager, DDS/SC	RS-232C, V.24, V.28, V.35	Up to 56K bit/sec.	Synchronous	V.35	Yes	Analysis	Yes	98V, 127V ac, 47Hz, 63Hz, 18W max.	0 -50 C	$1,195	847
Penril Datacomm (301) 921-8600	CSU/DSU 96	Combination	Synchronous	AT&T Dataphone Digital Service, metallic	RS-232	2,400, 4.8K, 9.6K bit/sec.	Synchronous	NA	No	No	No	110V, 60Hz	0 -50 C	$425	848
	CSU/DSU 56	Combination	Synchronous	AT&T Dataphone Digital Service, metallic	RS-232, V.35	Up to 56K bit/sec.	Synchronous	V.35	Yes	No	No	110V, 60Hz	0 -50 C	$795	
Racal-Milgo (305) 475-1601	CMS DSU 1500	DSU	Synchronous	DDS/SC	RS-232C	Up to 9.6K bit/sec.	RS-232	NA	Yes	CMS	Yes	105V, 129V ac, 12W max.	0 -50 C	$1,495	849
Siemens Data Switching Systems (516) 435-4270	SA56K-U	Combination	Synchronous	AT&T Dataphone Digital Service	DSU, DSU/CSU, AT&T compatibles	Up to 56K bit/sec.	Synchronous, asynchronous	V.54	No	No	NA	5W dc power from system	0 -50 C	Contact vendor	850

COMPANY	PRODUCT	SINGLE UNIT, DSU/CSU OR COMBINATION	SERIAL OR SYNCHRONOUS	COMMUNICATIONS MEDIUM	INTERFACES TO	TRANSMISSION RATES	PROTOCOLS SUPPORTED	CCITT STANDARD	NETWORK CONTROL	PERFORMANCE MEASUREMENT	SIDEBAND DIAGNOSTIC TESTING	ELECTRICAL POWER REQUIREMENTS	TEMPERATURE REQUIREMENTS	PRICE	DIAL-INQ READER SERVICE NUMBER
Siemens Data Switching Systems (516) 435-4270	SAS56K-A	Combination	Synchronous	AT&T Dataphone Digital Service	DSU, DSU/CSU, AT&T compatibles	56K bit/sec.	Synchronous, asynchronous	V.56 loop back	No	No	NA	5W dc power from system	0 -50 C	Contact vendor	850
Teleprocessing Products, Inc. (805) 522-8147	TP-557	Combination	Serial	AT&T Dataphone Digital Service	Data terminal equipment	19.2K, 56K bit/sec.	Synchronous	V.35	Yes	Multidrop network management system	Yes	117V ac, 51Hz, 63Hz	0 -50 C	$750	851
	TP-501	Combination	Serial	AT&T Dataphone Digital Service	RS-232	2,400, 4.8K, 9.6K bit/sec.	Synchronous	V.35	Yes	Multidrop network management system	Yes	117V ac, 51Hz, 63Hz	0 -50 C	$650	
Universal Data Systems, Inc. (205) 721-8000	D9.6	Combination	Serial	AT&T Dataphone Digital Service	PBX, data terminal equipment, RS-232, four-wire	2,400, 4.8K, 9.6K bit/sec.	All	—	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	$495-$595	852
	D56	Combination	Serial	AT&T Dataphone Digital Service	PBX, data terminal equipment, four-wire	56K bit/sec.	All	V.35	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	$795-$895	
	SW56, DSU/CSU/ACU	Combination	Serial	Accunet switched 56	PBX, data terminal equipment, RS-232, RS-366	56K bit/sec.	All	V.35	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	Contact vendor	
	DDS/MR	Combination	Serial	AT&T Dataphone Digital Service	PBX, data terminal equipment, RS-232C, RS-499, RS-530, four-wire	Up to 56K bit/sec.	All	V.35	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	Contact vendor	

PRODUCT FACE-OFF

Hayes vs. U.S. Robotics: Close match at 2,400 bit/sec.

Hayes Microcomputer Products, Inc. has earned a reputation as "the" modem maker for microcomputer users. The phrase "Hayes compatible" is a key specification for almost all microcomputer modem buyers, and the AT command set, pioneered by Hayes in its Smartmodem 300, is now a de facto standard in the modem industry.

By comparison, U.S. Robotics, Inc. has, until recently, been a dark horse in the market. Formed in 1976 to develop and sell acoustically coupled modems, the company made its name with the Password modem, one of the first inexpensive 1,200 bit/sec. modems to gain widespread acceptance.

Both Hayes and U.S. Robotics are selling well in the 2,400 bit/sec. arena — Hayes with its Smartmodem 2400 and U.S. Robotics with its Courier 2400 and 2400e.

The measure of a modem is how well it handles connections on standard telephone lines. Most of the time, users of both these modems find that the connections are acceptable, especially now that most long-distance phone companies are installing fiber-optic transmission systems. Satellite-based systems are almost ideal for data transmission, since full-duplex modems are affected far less by the half-second round-trip delay time than people trying to carry on a voice conversation.

The true test of a modem's mettle, however, is how well it works on a worse-than-average connection.

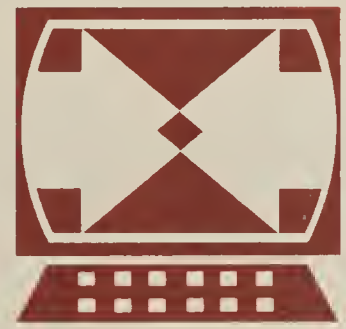
The Hayes Smartmodem 2400 is far more tolerant of impairments, once a connection is established, than the U.S. Robotics Courier 2400. But even that does not describe the entire story.

Modems that operate at 2,400 bit/sec. use adaptive equalization to compensate for defects in the transmission channel. When the connection is first established, each modem adjusts the equalizer to match the line conditions.

When the U.S. Robotics unit detects that line quality has dropped below a certain point, it will request the other modem to re-equalize, or retrain, while the connection is in progress. This disrupts the data flow.

In a live circuit, the modem's ability to adjust to changing circuit conditions is a plus, not a minus. So, although the Hayes modem is more adept at handling poor lines, the U.S. Robotics modem is more agile at 2,400 bit/sec., adapting to changing line conditions to achieve the best accuracy.

When line conditions are too adverse to use 2,400 bit/sec., the user must drop to 1,200 bit/sec. or even 300 bit/sec.



The Hayes modem is slightly better than U.S. Robotics' at communicating at 1,200 bit/sec. and significantly better at 300 bit/sec. The U.S. Robotics modem handles impairments better at 1,200 bit/sec. than it does at 300 bit/sec., making hash of the old communicator's proverb: "When in doubt, go 300." U.S. Robotics indicates it is working on improving the modem's performance at lower speeds.

Modem compatibility

Hayes excels in communications compatibility. Its modems can communicate with modems that adhere to CCITT recommendations. This includes the ability to connect at 600 bit/sec. Users in the U.S. do not need that capability, but companies with international connections will welcome the modem's ability to swing both ways.

The Courier 2400 is no slouch, however, when it comes to communicating with modems that follow the U.S. standards — Bell 103 and Bell 212A. In fact, users report that it was able to handle some marginally compatible 212A modems better than the Hayes Smartmodem 2400.

The Hayes 2,400 bit/sec. modems do not yet support any error-free transfer capability. U.S. Robotics offers Microcom Network Protocol (MNP) in its Courier 2400e product. MNP allows two modems supporting the protocol to recover automatically from errors that occur on the line.

Software compatibility

Hayes defined the standard command language with its Smartmodem 300. In the course of developing its 1,200 and 2,400 bit/sec. product lines, the company extended the language. Unfortunately, it also changed sections, prompting some users to chortle that the Hayes Smartmodem 2400 is not Hayes compatible. For most terminal emulation software running on micros and minis, however, the command set required to place and receive calls is identical across the product lines.

Hayes eliminated all but one jumper block and all DIP switches from the Hayes Smartmodem 2400. Instead, the default modem configuration is set using software, and the parameters are saved in nonvolatile memory within the modem. Since the software wields full control of all modem parameters, reconfiguration for a specific program can be completely hidden from a naive user.

U.S. Robotics uses DIP switches to set up the default modem configuration and adheres to the Smartmodem 1200 command set. Several extensions let the modem report full-call progress monitoring — voice answer and other-end ringing — to software in a standard way. U.S. Robotics' modem is superior for terminal use since the modem has Help information on the bottom of the unit and Help menus accessible while in command mode.

The U.S. Robotics modem offers only asynchronous communications. Hayes offers synchronous modes as well, a cost-effective means of implementing micro-to-mainframe applications using V.22bis communications technology. Most existing modems on mainframes tend to be AT&T 201C and 208A/B modems at 2,400 and 4.8K bit/sec. in half-duplex mode. The Hayes modem makes an excellent replacement for 201C-based systems, since it acts like a 201C leased-line modem in a four-wire arrangement.

Price

The Hayes modem carries a list price of $899, although some mail-order houses have recently been quoting prices around $550.

The "plain" U.S. Robotics Courier 2400 lists for $599 and can be found for $350. The Courier 2400e supporting the MNP costs $699.

Buying a Courier modem does mean foregoing international communications and synchronous capability, but in many applications these features are unnecessary, so the extra $200 would be wasted.

For computer room use, both U.S. Robotics and Hayes offer rack-mount versions of their products. This reduces the bulk in those situations in which a large number of modems are required to be in one place. The stand-alone modems work best for both terminal and microcomputer users. ●

STEPHEN SATCHELL

Fiber-optic modems

COMPANY	PRODUCT	INTERFACES TO	TRANSMISSION RATES	TRANSMISSION DISTANCE	PROTOCOLS SUPPORTED	CCITT STANDARDS	SELF-TESTING	LOOPBACK TESTING	PERFORMANCE MEASUREMENT	ORIGINATE OR RECEIVE	ELECTRICAL & POWER REQUIREMENTS	TEMPERATURE REQUIREMENT	PRICE	DIAL-INQ READER SERVICE NUMBER
American Photonics, Inc. (800) 626-5745	TR2000	RS-232 data terminal equipment	125K bit/sec.	1 km	All	NA	Yes	Yes	—	Both	15 V dc	0°-50 C	$125	853
Artel Communications Corp. (617) 752-5690	LS-100	IBM 3250, 5080	Up to 2M bit/sec.	3 miles	IBM 3250, 5080	NA	Yes	Yes	Netserver	Both	110V	0°-50 C	$1,500	854
Black Box Corp. (412) 746-5565	Fiber-optic line-driver	Any serial RS-232 device	Up to 19.2K bit/sec.	1,100 to 13,120 ft	Asynchronous RS-232	V.24	No	Yes	No	Both	12V dc external, pin 9/RS-232	0°-45 C	$159-$199	855
Burr-Brown Corp. (602) 746-1111	LDM 80	Any serial RS-232 port	19.2K bit/sec.	35 km	All	V.24	Yes	Yes	—	Both	±6V	0°-70 C	$9,850	856
	LDM 85	RS-232, RS-422, RS-485, multipoint	5M bit/sec.	2 km	All	—	Yes	Yes	—	Both	110V, 3W	0°-70 C	$165	
Canoga-Perkins Corp. (818) 888-2003	2290	RS-422, RS-232C, RS-423, T1, all interfaces field-interchangeable	Up to 12M bit/sec.	6 km	All	V.35	Yes	Yes	No	Both	110V	0°-40 C	$450-$1,600	857
	2280	RS-422, RS-232C, RS-423, T1, all interfaces field-interchangeable	Up to 12M bit/sec.	6 km	—	V.35	No	No	No	Both	110V	0°-40 C	$1,250-$1,400	
	2260	T1 ports	Up to 2.048M bit/sec.	6 km	All	T1	Yes	No	No	Both	110V	0-40°C	$650-$800	
	2250	RS-422, RS-232C, RS-423 ports	Up to 200K bit/sec.	6 km	All	V.35	Yes	Yes	No	Both	110V	0°-40 C	$350-$450	
	CDS-232	RS-232	19.2K bit/sec.	1 km	All	NA	No	No	No	Both	12V dc	0°-40 C	$145	
Codenoll Technology Corp. (914) 965-6300	Codenet-3030A	Ethernet	10M bit/sec.	4 km	802.3 Ethernet	8802	No	No	No	Both	5V	0°-50 C	$785	858
	3035	Data terminal equipment	200K to 5M bit/sec.	10 km	Asynchronous, synchronous	V.35	No	Optional	No	Both	+5V, -5.2V	0°-50 C	$995	
	3422	Data terminal equipment	Up to 5M bit/sec.	10 km	Asynchronous, synchronous	RS-422	No	Optional	No	Both	+5V, -5.2V	0°-50 C	$895	
	3001	T1, T1C ports	1.544M, 2.048M, 3.088M bit/sec.	14 km	Synchronous	M1	No	Optional	No	Both	+5V, -5.2V	0°-50 C	$1,195	
Fibercom, Inc. (703) 342-6700	Whisperlink/232	RS-232	Up to 19.2K bit/sec.	5 km	NA	NA	No	Yes	No	Both	115V, 6W	—	$495	859
	Whisperlink/422	RS-422 multidrop	2M bit/sec.	2 km	NA	NA	No	Yes	No	Originate	115V, 6W	—	$650	
	Whisperlink/SNA	IBM 3274 controllers and IBM data terminal equipment, Type A	2.358M bit/sec.	1,500 ft	IBM SNA	NA	No	Yes	No	Originate	115V, 6W	—	$395	
Fibronics International, Inc. (617) 778-0700	FM 1601	Coax, IBM 3270, 5580	2M-10M bit/sec.	3 km	All	NA	Yes	Yes	NMS	Both	110V, 220V	0°-50 C	$1,100	860
Focom Systems International Ltd. (617) 626-8570	1519	RS-232	Up to 19.2K bit/sec.	5 km	All	V.24	Yes	Yes	No	Both	115V, 45Hz, 65 Hz	-10°-60 C	$800	861
Gandalf Data, Inc. (312) 541-6060	PACX 2000	PACX components	9.28M bit/sec.	5 km	PACX	NA	Yes	No	Netscan 2000	Both	15V	0°-50 C	Contact vendor	862
Richard Hirschman of America, Inc. (800) 225-0524	OXDV series	RS-232	50K-100K bit/sec.	1 mile	RS-232C and compatibles	—	NA	NA	No	Both	Pins 18 and 25, ±12V or externally powered	-20°-80 C	$150-$1,000	863
	OXDV RS-422	RS-422	5M-10M bit/sec.	1 mile	RS-422 and compatibles	—	NA	NA	No	Both	Pins 18 and 25 ±12V or externally powered	-20°-80 C	$500	
Honeywell Information Systems (800) FOROPTO	HFM 5200/5210	RS-232	dc to 19.2K bit/sec.	3.5 km	RS-232 asynchronous	V.24	No	No	No	Both	5V	0°-70°C	$96-$145	864
	HFM 5100	RS-232 VTE, Tempest applications	dc to 78K bit/sec.	1 meter to 3 km	RS-232 asynchronous, synchronous	V.24	No	Yes	No	Both	+12, 300 mA; -12, 40 mA	0°-70 C	$400-$620	
	HFM 5120/5130	RS-232 ports	dc to 19.2K bit/sec.	3.5 km	RS-232 asynchronous, synchronous	V.24	No	Yes	No	Both	+12, 300 mA; -12, 40 mA	0°-70 C	$200-$300	
	HFM 5300/5305	IBM twinax and coax	Twinax: 1M-bit coax: 2.38M bit/sec.	4.5 km	IBM	None	No	No	No	Both	10.5V, 500 mA	0°-70 C	$400-$1,000	
International Data Sciences, Inc. (800) IDSDATA	ODS-106	RS-232 asynchronous data terminal equipment, data communications equipment	19.2K bit/sec.	250 ft	All	NA	No	No	No	Both	±12V	0°-50 C	$119	865

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	INTERFACES TO	TRANSMISSION RATES	TRANSMISSION DISTANCE	PROTOCOLS SUPPORTED	CCITT STANDARDS	SELF-TESTING	LOOPBACK TESTING	PERFORMANCE MEASUREMENT	ORIGINATE OR RECEIVE	ELECTRICAL & POWER REQUIREMENTS	TEMPERATURE REQUIREMENT	PRICE	DIAL-INQ READER SERVICE NUMBER
International Data	ODS-107	RS-232 asynchronous data terminal equipment, data communications equipment	19.2K bit/sec.	500 ft	All	NA	No	No	No	Both	± 12V	0 -50 C	$160	
Lightwave Communications, Inc. (203) 438-3591	FO-232	Data terminal equipment, data PBX	0-100K bit/sec.	2 km	All	V.24, V.28	No	Yes	No	Both	12V external, 12V internal, pin 9, RS-232	0 -50 C	$140	866
	FO-232 LD	Data terminal equipment, data PBX	0-100K bit/sec.	4 km	All	V.24, V.28	No	Yes	No	Both	12V external, 12V internal, pin 9, RS-232	0 -50 C	$190	
	FO-232H	Data terminal equipment, data PBX	0-100K bit/sec.	2 km	All	V.24, V.28	No	Yes	No	Both	6-15V, pins 9 or 19, RS-232	0 -50 C	$89	
	FO-422	Data terminal equipment, data PBX	10M bytes	2 km	All	NA	No	Yes	No	Both	12V external, 12V internal, pins 9, 10, 11, 12	0 -50 C	$295	
Manage, Inc. (413) 598-8204	FOM-1232	RS-232 asynchronous	0-56K bit/sec.	4,000 meters	RS-232 (all)	V.24, V.28	No	No	No	Both	110V ac	-25 -50 C	$390	867
	FOM-232	RS-232	56K bit/sec. asynchronous, 29K bit/sec. synchronous	6 km	RS-232 (all)	V.24, V.28	No	No	No	Both	110V ac	-25 -50 C	$475	
	FM-DTX200	T1 ports	6.5M bit/sec.	4 km	All	T1	No	No	No	Both	105V-140V ac, 60Hz	0 -50 C	$850	
	FM-DRX 210	T1 ports	6.5M hit/sec.	4 km	All	T1	No	No	No	Both	105V-140V ac, 60Hz	0 -50 C	$925	
Math Associates, Inc. (516) 334-6800	XR-1000	RS-232C	100K bit/sec.	2,000 + meters	RS-232 asynchronous	RS-232	Yes	Yes	Yes	Both	115V ac, 50Hz-60Hz	0 -50 C	$500	868
	XR-1100	RS-232C	100K hit/sec.	2,000 + meters	RS-232 asynchronous	RS-232	No	No	Yes	Both	6.3V-18V ac, 50Hz-60Hz	0 -50 C	$235	
	XR-1150/55	RS-232C data terminal equipment, data communications equipment	100K bit/sec.	2,000 + meters	RS-232 asynchronous	RS-232	Yes	Yes	Yes	Both	—	0 -50 C	$155	
	XR-1160	RS-232C data terminal equipment, data communications equipment	100K bit/sec.	1,000 + bit/sec.	RS-232 asynchronous	RS-232	Yes	Yes	Yes	Both	+ 8V, 10 mA max.	0 -50 C	$155	
Optelecom, Inc. (301) 840-2121	MD-4121	RS-232	100K bit/sec.	1 km	Asynchronous	V.24, V.21	No	No	No	Both	ac power adapter or host power on pin 9	-20 -50 C	$150	869
	MD-4131	RS-232	19.2K bit/sec.	2 km	Asynchronous	NA	No	No	No	Both	EIA	-20 -50 C	$100	
	MD-4133	AMP ADM optical ports	19.2K bit/sec.	200 meters	RS-232	NA	No	No	No	Both	Data power from RS-232	-20 -50 C	$100	
	MD-4141	SMA optical ports	19.2K bit/sec.	3 km	RS-232	NA	No	No	No	Both	ac power adapter	-20 -50 C	$115	
Optical Data Systems (214) 234-6400	ODS 107	RS-232	56K bit/sec.	2 miles	Asynchronous	—	No	No	No	Both	6 mA	—	$160	870
	ODS 219	RS-449	4.8K - 2.048M bit/sec.	2 miles	Asynchronous, synchronous	—	Yes	Yes	Yes	Both	110V	—	$995	
	ODS 100	RS-232	64K bit/sec.	2 miles	Asynchronous, Synchronous	—	Yes	Yes	Yes	Both	110V	—	$400	
	ODS 115	RS-232	150K bit/sec.	2 miles	Asynchronous, Synchronous	—	Yes	Yes	Yes	Both	110V	—	$1,195	
	ODS 400	IBM	2.35M bit/sec.	2 miles	3,274	—	Yes	NA	Yes	Both	110V	—	$445	
	ODS 700	DSX-1	1.544M bit/sec.	2 miles	T1	—	Yes	Yes	Yes	Both	110V	—	$895	
	ODS 234	Ethernet	10M bit/sec.	Network dependent	Ethernet (all)	—	Yes	Yes	Yes	Both	Interface	—	$695	
	ODS 218	V.35	4.8M -2.048M bit/sec.	2 miles	Asynchronous, Synchronous	—	Yes	Yes	Yes	Both	110V	—	$995	
Pilkington Communications Systems, Inc. (805) 522-3333	209	RS-232, RS-449	1,200K-256K bit/sec.	3 km	All	V.35	No	Yes	No	Both	115 or 230 half A	0 -40 C	$695	871
	306	RS-422	19.2K -2.2M bit/sec.	4 km	All	V.35	No	Yes	No	Both	115 or 230 half A	0 -40 C	$1,095	
	401	T1, AT&T public, 41451	1.544M hit/sec.	5 km	All	G703	No	Yes	No	Both	115 or 230 half A	0 -40 C	$1,295	
	105	RS-232, RS-449, TTL	Up to 5M bit/sec.	2 km	All	None	No	No	No	NA	12V dc, 0.2A	0 -40 C	$200	
Quanta Communications Systems, Inc. (714) 970-2966	QCS 6200DS	Data terminal equipment, data communications equipment, asynchronous	Up to 19.2K bit/sec.	200 ft	RS-232 asynchronous	V.24	No	No	No	Both	Data terminal equipment, data communications equipment supported	0 -50 C	Contact vendor	872
	QCS 6100DS	Data terminal equipment, data communications equipment, asynchronous	Up to 19.2K bit/sec.	1 km	RS-232 asynchronous	V.24	No	No	No	Both	Data terminal equipment, data communications equipment supported	0 -50 C	Contact vendor	
	QCS 1100 DS	T1 ports	1.544M bit/sec.	3 km	T1	NA	Yes	Yes	No	Both	89V-127V ac, 60Hz	0 -40 C	Contact vendor	
	QCS 1200DS	G703 equipment	2.048M bit/sec.	Up to 3 km	G703	G703	Yes	Yes	No	Both	110V-220V	0 -40 C	Contact vendor	
Racal-Milgo (305) 475-1601	Fibermode 1100 T1	T1 ports	1.5M bit/sec.	1.8 miles	All	NA	No	Yes	—	Both	89V-127V ac 60Hz	0 -50 C	$1,200	873

COMPANY	PRODUCT	INTERFACES TO	TRANSMISSION RATES	TRANSMISSION DISTANCE	PROTOCOLS SUPPORTED	CCITT STANDARDS	SELF-TESTING	LOOPBACK TESTING	PERFORMANCE MEASUREMENT	ORIGINATE OR RECEIVE	ELECTRICAL & POWER REQUIREMENTS	TEMPERATURE REQUIREMENT	PRICE	DIAL-INQ READER SERVICE NUMBER
Racal-Milgo (305) 475-1601	Fibermode 6100	Asynchronous data terminal equipment	19.2K bit/sec.	1.62 miles	All	NA	No	Yes	—	Both	Data terminal equipment, data communications equipment dependent	0 -50 C	$176	873
Raycom Systems, Inc. (303) 530-1620	2100	Asynchronous RS-232	Up to 100K bit/sec.	4,000 ft	RS-232C	RS-232C	No	No	No	Both	± 8V, internal, external	0 -50 C	$195	874
	2500	Asynchronous RS-422	5M bits	4,000 ft	RS-422	RS-422	No	No	No	Both	± 8V, internal, external	0 -50 C	$295	
	2300/2302	Centronics printer	Up to 3,000 line/min	3,000 ft	Centronics	NA	No	No	No	Both	9V, external	0 -55 C	$695	
	2600	T1 ports	1.544M bits	4-20 km	NA	NA	No	Yes	No	Both	120V	0 -50 C	$900-$4,800	
S.I. Tech, Inc. (312) 232-8640	Bitdriver 2005	Asynchronous RS-232	Up to 56K bit/sec.	2-5 km	All	V.24, V.28	Yes	Yes	No	Both	110V ac	0 -70 C	$220	875
	Minibitdriver 2505	Asynchronous RS-232 data link	Up to 56K bit/sec.	2-5 km	All	V.24, V.28	No	No	No	Both	CPU-powered	0 -50 C	$120	
	Arcnet 2853	Arcnet	2.5M bits	2-5 km	Arcnet	NA	Yes	Yes	No	Both	930 HM coax, 110V ac	0 -70 C	$450	
	Omninet 2852	Omninet and RS-485	1M bit	2-5 km	Omninet	NA	Yes	Yes	No	Both	110V ac	0 -70 C	$450	
Versitron (202) 722-8600	Micro 232	RS-232	0-76K bit/sec.	1.3 km	—	NA	No	Yes	No	Both	120V ac, 9W	0 -50 C	$195	876
	FOM 907A	RS-232, MIL-188	0-38.4K bit/sec.	2 km	—	NA	No	Yes	No	Both	120V ac, 9W	0 -50 C	$862.50	
	FOM 9207	RS-232, MIL-188	0-76.2K bit/sec.	2 km	—	NA	No	Yes	No	Both	120V ac, 9W	0 -50 C	$1,328	
	F9205	TTL, RS-232, RS-422, RS-123, MIL-188	76.8K bit/sec.	2 km	—	V.35	No	Yes	No	Both	120V ac, 9W	0 -50 C	$1,475	

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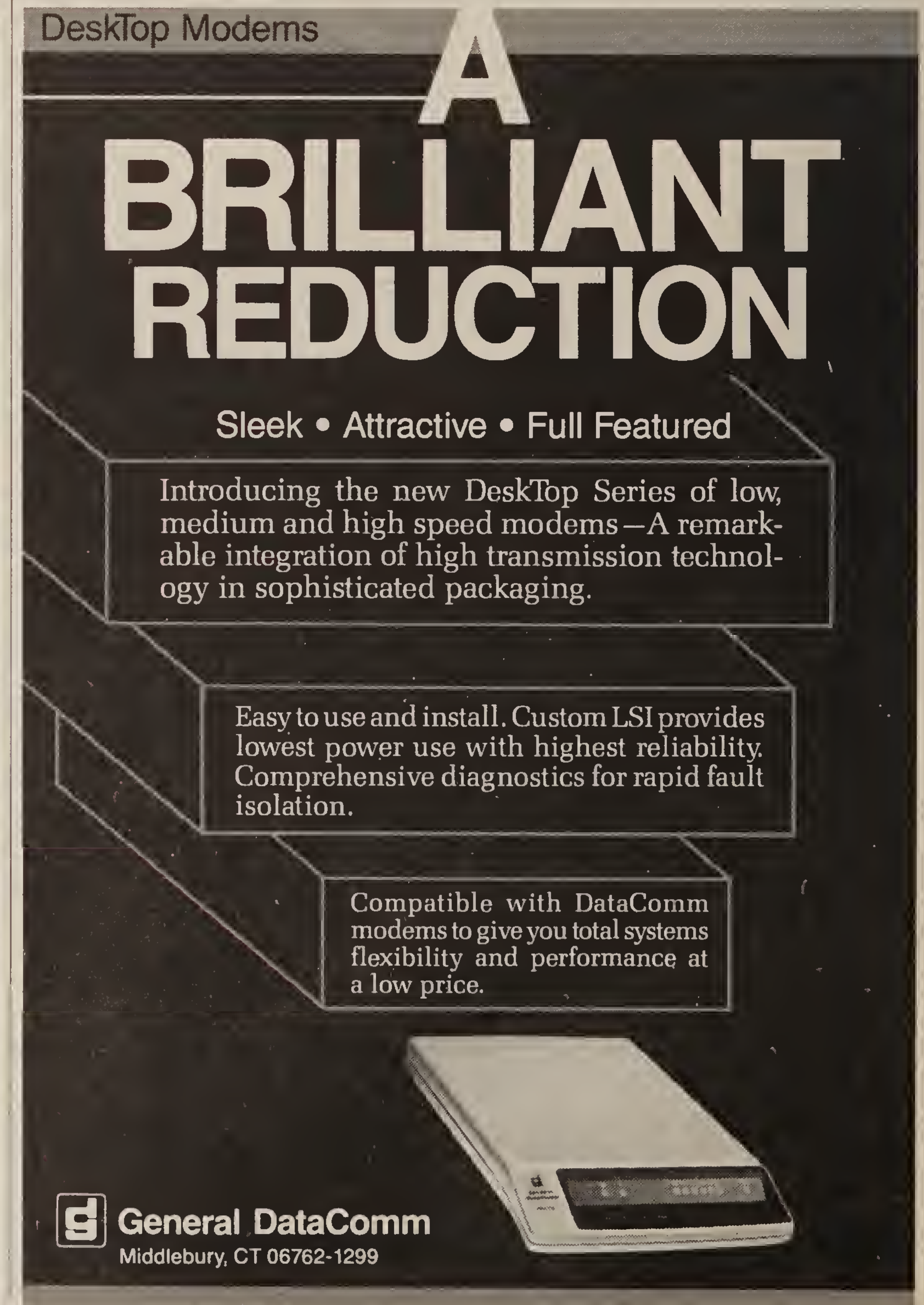
DIAL-INQ READER SERVICE NUMBER 43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No other 4800 bps dial-up modem makes more sync connections, more ways, more automatically. With a 4850PA, you get both 208B and V.27 *ter* compatibility. You also get BSC, SNA/SDLC and HDLC serial autodialers, plus an 801 parallel autodialer. You can even upgrade it to 9600 bps. Which means the 4850PA can sync up with just about everything.

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19,200 bps.

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The AX/9624c delivers the high throughput of leased-line modems at a fraction of the cost.

And although it is priced higher than slower dial modems, the AX/9624c saves you substantially more money on every phone call. In fact, if you use the AX/9624c for just three hours a week, it can pay for itself in phone bill savings in under a year. Using a slower modem isn't economizing, it's wasting money.

YOU GET WHAT YOU PAY FOR.

Comparative costs of sending 360,000 bytes of data over ordinary phone lines.

Throughput	Transfer Time	Cost of call ($20/hr.)
1200 bps	50 min.	$16.67
2400 bps	25 min.	$ 8.33
9600 bps	**6 min., 15 sec.**	**$ 2.08**
19,200 bps	**3 min., 7 sec.**	**$ 1.04**

Of course, you'd expect to sacrifice a lot of accuracy to go this fast.

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Error free.

The AX/9624c provides 100% error-free communications. Which shouldn't surprise you. Because it's from Microcom, the leader in error-correction technology and the inventor of Microcom Networking Protocol (MNP). The recognized industry standard.

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DIAL-INQ READER SERVICE NUMBER 46

HARD TALK

James Connolly

Goodbye, paper chase

Estimating industry growth can be frustrating if the industry is undefined. So, people involved with industries in the formative years must determine which technologies fit into their markets before they determine where the markets are heading.

One trade and professional organization recently took that step and discovered its market — information and image management — had the potential to more than double by 1996. What the Association for Information and Image Management (AIIM) says it expects is a massive user shift to conversion of paper documents to electronic documents.

AIIM, which expects 15,000 people at its 1987 AIIM Show in New York next month, commissioned a study by Coopers & Lybrand. The study shows the U.S. information and image management market growing from $2.5 billion in 1986 to $6.5 billion by 1996.

The report also calls for greater professionalism — more sophisticated marketing and

Continued on page 57

Bank regroups MIS, cuts costs

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — First National Bank of Chicago, one of the nation's largest banks, has made distributed processing an art during the last 10 years.

The bank's individual business units have been encouraged to choose the software applications that best suit their business needs, and the job of data processing managers is to support those applications with hardware.

But recently, the trend toward decentralization was partially reversed, at least in the systems area. That is because the bank's MIS and Systems organization and the Systems Steering Committee, chaired by the bank's president and other top managers, concluded that they could gain greater efficiencies from restructuring the location and management of computer resources.

Since the late 1970s, First Chicago's 150 Strategic Business Units have shopped independently for systems to support their activities, which resulted in the scattering of significant computer resources in multiple sites. Today, the bank supports 10 different operating environments on machines from four primary vendors — IBM, Tandem Computers, Inc., Wang Laboratories, Inc. and AT&T. The resources are spread among 56 First Chicago computing centers around the world.

"We've wrestled with centralization and decentralization for many years," says Robert Hokom, vice-president of MIS and Systems. Even with greater centralization, none of the hardware systems have been dropped. But steps are being taken to regroup like computer systems in the same data center. Hokom says the move is intended to improve worker productivity by creating centralized data centers that bring the bank's systems operators and programmers closer to the hardware they maintain.

A prime example of this policy is a plan that was devised to consolidate the seven computer rooms housing Tandem computer systems in the Chicago area into just two. That way, Hokom explains, economies in power, shared resources and lower operating costs could be realized.

"What you get with centralization is efficiency," Hokom says. "You can put all the equipment into one place and service it with one staff." But, he cautions, one central MIS site is not favored, even for the bank's IBM 3090 mainframes, which are dispersed in three data centers in Illinois.

"We have two strategic objectives at First Chicago," explains Salvatore Campagna, vice-president in charge of the bank's Remittance Banking lockbox group, which runs Digital Equipment Corp. computers (see story page 54). "We want to be the premier commercial bank in the Midwest and the premier consumer bank. To do that, we've broken the business into distinct product and business areas, so that each area has all the authority it needs to carry out its task."

But there is centralized coordination of the systems groups' activities. The MIS and Systems organization, which has 35 managers, oversees an annual budget of about $130 million and is

Continued on page 54

At a glance

FIRST CHICAGO
The First National Bank of Chicago

Assets: $39.148 billion.
1986 net income: $276.2 million.
Rank: 11th largest bank holding company in U.S.
Employees: 13,200 worldwide.
MIS employees: 825.
VP MIS: Robert Hokom.
MIS budget: $130 million.
Principal systems: IBM 3090 mainframes, Tandem Computers, Inc. Nonstop transaction processors, Wang Laboratories, Inc. VS 300 office systems, AT&T 3B2 minicomputers, Digital Equipment Corp. VAX and PDP-11 minicomputers for lockbox and international trading.

INFORMATION PROVIDED BY FIRST CHICAGO

Subsystem targets DEC minis

MILPITAS, Calif. — System Industries, Inc., a maker of Digital Equipment Corp.-compatible peripherals, has announced a tape subsystem designed for use with most DEC minicomputers.

The SI 9625 Tape Subsystem is a dual-density backup product featuring an enhanced 100 in./sec. streaming capability and a 50 in./sec. start-and-stop mode. It also features automated tape loading and a 256K-byte cache buffer to improve streaming performance, according to System Industries.

The product was designed to be compatible with DEC's TE16, TU45 and TU77 formats. System Industries officials claimed that a special capstan drive-tension arm buffering allows eight times faster buffering than typical streamers.

System Industries said the subsystem carries a one-year, on-site warranty and ranges in price from $19,000 to $25,000 depending upon the processor attached.

Inside

- Minis fit in with bank's mainframe-based strategy. Page 54.
- Early '88 release predicted for System/36, 38 heir. Page 56.
- Mupac rolls out line of VME backplanes. Page 58.

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Bank employs alternative solutions for lockbox operation

Even in a computer environment dominated by IBM and Tandem Computers, Inc., the opportunity to go with alternate vendors is supported by the First National Bank of Chicago's centralization policy.

A case in point is the Remittance Banking Division's lockbox operation. This strategic business unit is responsible for collecting and processing checks that have been sent to 2,400 corporate clients' lockboxes for payment. It supports that function with two Digital Equipment Corp. VAX 8200s, three PDP-11/44s and a Microvax II, which is linked to the data base that schedules work loads. Only one other bank strategic business unit is based on DEC hardware systems — a set of VAX-11/785s. The two business units are discussing combining their DEC systems into a single operation, furthering the bank's consolidation strategy.

The lockbox operation has autonomy in making systems decisions, says Salvatore Campagna, vice-president in charge of lockbox systems. "If I think I'm running out of capacity, I can ask that the MIS and Systems group buy more DEC equipment for me," Campagna explains. The lockbox systems support offices in New Jersey, North Carolina, Texas and California. Each remote site is connected by leased lines to the Chicago processing center.

In Campagna's area, the purchase of a custom $50,000 workstation prompted the DEC system support. More than 20 special workstations optically and magnetically read the checks. After an operator enters the dollar figures through a keyboard, the workstations sort the checks for delivery.

The table-size workstations are driven by PDP-11s. Because of the system's specific requirements, the lockbox system is a set of three DEC PDP-11/44s, a VAX 8200 and four high-capacity RA-81 456M-byte disk drives.

To each strategic business unit, Campagna explains, the MIS and Systems group is really a financial and administrative resource. "They do all the coordination, and they handle all the systems procurement," Campagna says.

JEAN S. BOZMAN

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Assistant Director, Computer Services
Arkansas Department of Education, MSRTS

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Bank regroups

CONTINUED FROM PAGE 53

responsible for the hiring and placement of data processing personnel — 825 worldwide and 780 in the Chicago area. MIS and Systems also procures all systems equipment, in part to allow for savings from volume purchases.

While there is great variety in the systems supported, Hokom says systems support is more coherent than it was. "We're more centralized than we were a year ago. We've created larger systems organizations. But that's not to say we're moving toward one central MIS site."

Instead, DP professionals will work with the bank's business managers to determine whether a given system is to be moved, upgraded or retained. "We give our systems managers charters to go out and make a business case to all of the distributed business centers for providing a new utility," Hokom adds.

In some cases, he says, the sales pitch did not work, and some of the businesses have decided to keep their Tandem or Wang systems closer to the end-user sites. "We'll try to achieve some of the efficiencies of centralization where possible," he says. "But it's difficult to support all the elements of a given business with one system. We have to make sure that each business has the ability to select the application they think is most appropriate to their needs."

The consolidation of Tandem systems, expected to be completed by the end of this year, reflects the strategic importance of the Tandem computers, which are tied to other Tandems in 20 major sites around the world.

Linked through Tandem's Expand Network, the processors direct the transfer of money from New York and Chicago to points such as London; Paris; Dubai, United Arab Emirates; Tokyo; Seoul, S. Korea; Singapore; and Sydney, Australia.

The eight Chicago Tandem systems — containing three to 15 processors each — are being upgraded to the new VLX design. Older units, including Nonstop IIs and Tandem TXPs, will be upgraded by the end of this year, according to Peter Miller, senior vice-president of DP for the bank.

"The upgraded machines will be put in one of the existing computer rooms, and some of the older systems will go back to Tandem," he says. New VLX systems will go into a new computer room.

The upgrade in Tandem computers followed a year-earlier upgrade of the bank's three major IBM DP centers. A

Continued on page 57

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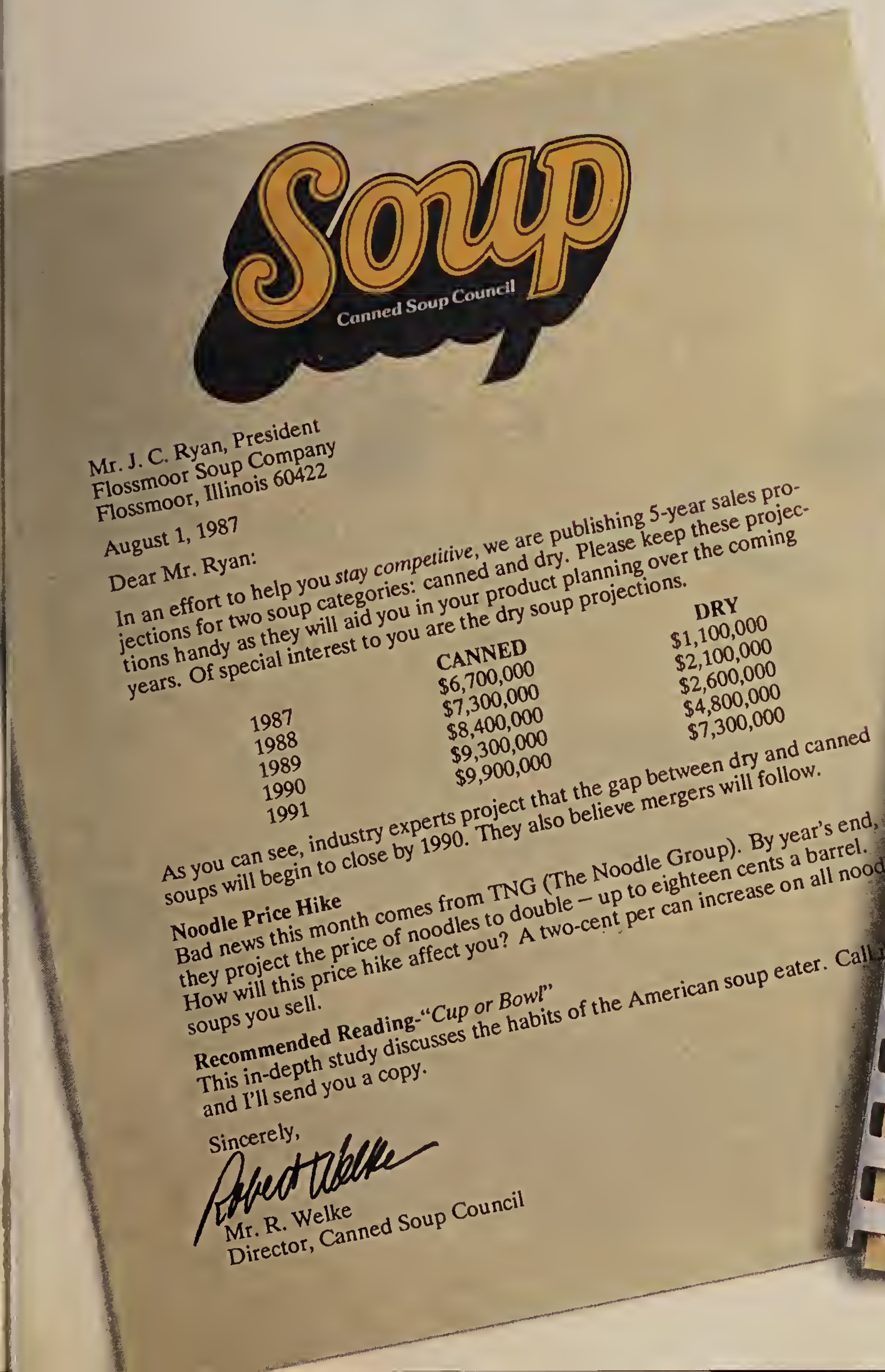


Soup
Canned Soup Council

Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you *stay competitive*, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

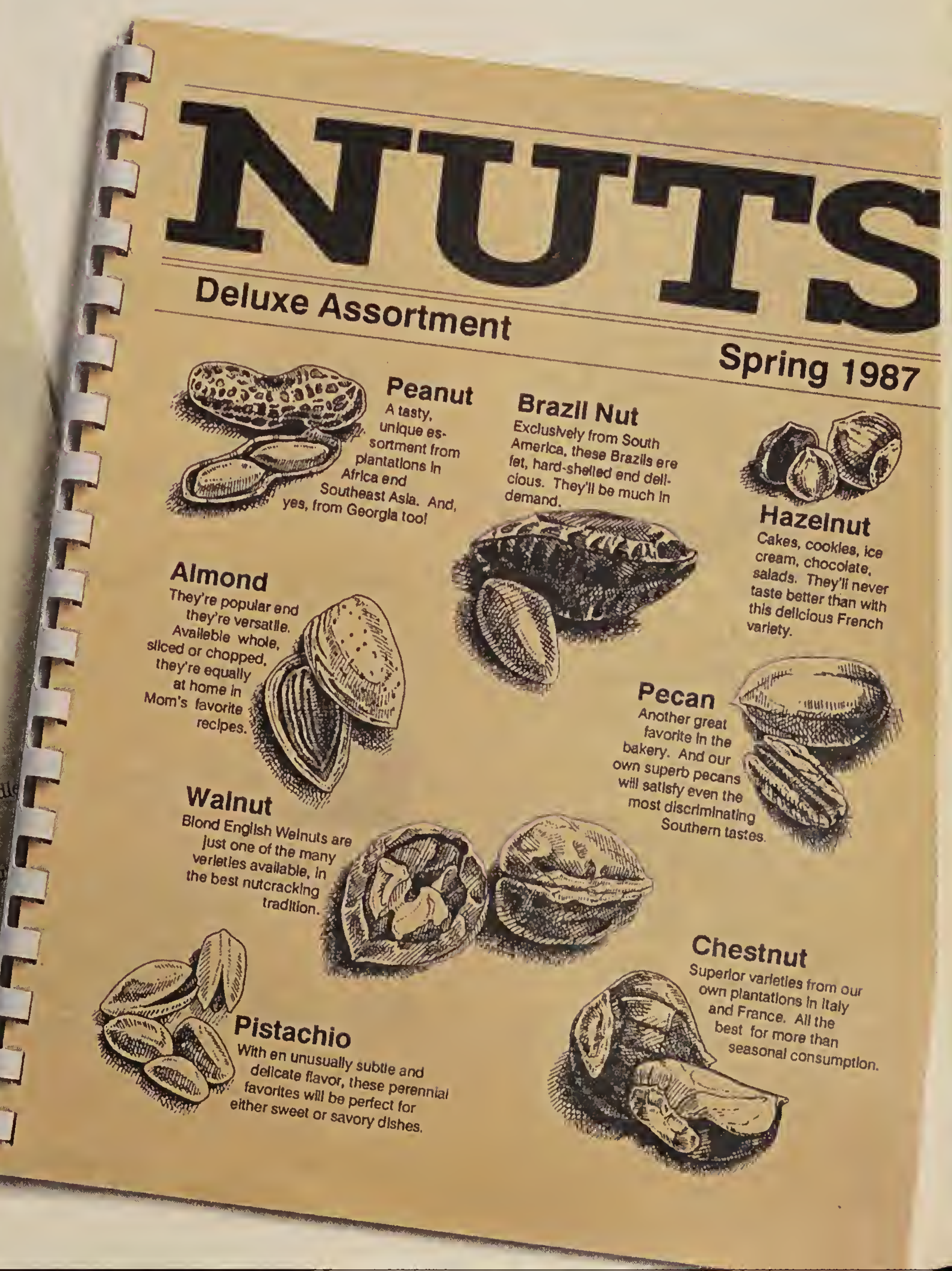
As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

Noodle Price Hike
Bad news this month comes from TNG (The Noodle Group). By year's end, they project the price of noodles to double – up to eighteen cents a barrel. How will this price hike affect you? A two-cent per can increase on all noodle soups you sell.

Recommended Reading-"*Cup or Bowl*"
This in-depth study discusses the habits of the American soup eater. Call and I'll send you a copy.

Sincerely,

Mr. R. Welke
Director, Canned Soup Council



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Spring 1987

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With an unusually subtle and delicate flavor, these perennial favorites will be perfect for either sweet or savory dishes.

System/38 kicker expected this year

BY STANLEY GIBSON
CW STAFF

CHESHIRE, Conn. — IBM's successor to its System/38 and 36 minicomputers, reportedly code-named "Silverlake," will arrive in early 1988, although pieces will appear this year, according to a consultant specializing in the System/38.

David Andrews, president of ADM, Inc., a Cheshire-based consulting firm, recently published his observations and predictions in a study entitled, "Toward Three Architectures: IBM's Mid-Range Strategy." The three architectures outlined in the study are those of the IBM Personal Computer, the System/36 and 38 and IBM 370-based machines.

"Silverlake won't happen all at once," Andrews says, adding that he expects several System/38 enhancements before the Silverlake debut, some of which could appear within the next few months. The consultant says a larger System/38 memory capacity, growing from 32M bytes to 64M bytes, is likely and technically easy to accomplish. He adds that he anticipates a new release of CPF, the System/38 operating system. Other enhancements could include speeding up the System/38 microprocessors, adding ASCII terminals or repackaging and cutting prices.

Foreshadowing

Andrews also says a key to Silverlake — the ability to run the System/36 operating system, SSP — will probably be announced for the System/38 prior to Silverlake itself. According to Andrews, that will come after the buying market has taken into account the inevitability of Silverlake and the inevitable demise of the System/36.

Andrews notes that sources at IBM indicate SSP can already run under CPF. The timing of the announcement of the capability, he says, will depend on marketing considerations, not technological feasibility.

Once Silverlake does appear, "It will become functionally compatible with DB2, although underneath, it will be different," Andrews says. In addition to compatibility with IBM's DB2 data base management system, Silverlake features will include a direct channel interface to IBM's 9370 departmental processor.

Other predictions Andrews makes in his report are that IBM's Solutionpac series of office automation software is essentially a "Band-Aid" to tide IBM over until it can design a new office automation series that will make both Professional Office System and Solutionpacs obsolete.

Andrews stresses that repeated consultations with IBM have shown him the firm is committed to the System/38. "There is no reason people should stop buying the System/36 and 38. Investments in disks, terminals and software will be protected," Andrews says, though he cautions, "IBM always keeps its options open until the last minute, however."

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Bank regroups

FROM PAGE 54

thorough rearrangement of the IBM mainframes has yielded annual savings of $1 million or more, Miller says. Savings came from the need to run fewer copies of the operating systems and from grouping the mainframe resources near high-capacity disk drives.

One IBM center handles all consumer credit card transactions with an IBM 3090 Model 200. A second IBM shop tracks corporate accounts of mid-size businesses with a 3090 Model 180 and an older IBM 3083.

A third IBM center serves the bank's top corporate clients — many of them Fortune 1,000 businesses — as well as the thousands of local consumer checking and savings accounts. This banking center recently updated from an IBM 3084, a multiprocessor IBM 3033, an Amdahl Corp. V8 and an IBM 3081. The new grouping consists of two 3090 Model 400s running IBM's MVS and a single 3090 Model 200 runnning IBM VM interactive applications.

The bank also hosts Wang VS 300 minicomputers at three different Chicago locations to support both office automation and electronic-mail functions. These computers were recently upgraded to the point at which a single VS processor replaced three older Wang minicomputers. About 60% of the Wang processing power is now located in a single computer room, Hokom says.

A fourth vendor, AT&T, is responsible for telephone and data switches as well as several 3B2 departmental processors. AT&T's System 85 private branch exchange and Information Systems Network switch move voice and data signals around eight sets of corporate offices in Chicago's downtown Loop area, Hokom says.

All of these sites are linked by fiber-optic cables, while coaxial cable and twisted-pair wiring are used within the buildings.

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Goodbye

FROM PAGE 53

customer support — on the part of old-line suppliers such as those that provide paper-to-micrographics conversions and computer output microfilm systems.

For the vendors, the key to the information and image management market is tying together several technologies, such as optical storage, high-speed communications, image scanning and high-speed CPUs.

Those technologies must combine to let users electronically store and retrieve vital documents and sometimes merge those images with text.

AIIM cites the need for a bank to store the image of a check and have it readily accessible to users in several bank departments.

Slaying sacred cows

However, no matter how well vendors merge technologies, the growth of information and image management is equally dependent upon how user organizations implement those technologies. That means plenty of sacred cows must be slain and plenty of domains — where bureaucrats control information because they control the key to the filing cabinet — must be opened to each corporation's computing public.

To accomplish that, technologies such as optical storage and image scanning must be promoted not only at the level of the MIS director or chief information officer but also at that sometimes-bureaucratic departmental level.

Departments are the place where pilot programs succeed and where department heads can realize the benefits of automation.

If vendors try to force technologies on those managers only through MIS, rather than making departments want automation, electronic information and image management may find itself hamstrung by the old bureaucratic response, "We can't do it that way because we've always done it this way."

Connolly is *Computerworld*'s senior editor, systems & peripherals.

NEW PRODUCTS

Turnkey systems

Summit Software Corp. has announced its **Summit Laser-Base Filing System**, a laser disk-based document storage system.

The system is said to integrate optical-laser technology, a super-microcomputer, high-resolution monitor, desktop scanner and laser printer to store and retrieve pictures and text.

The system can file and catalog up to one billion pages of pictures and text, access any document in 30 seconds or less and store the contents of 500,000 file cabinet drawers in the space equivalent to one secretarial workstation, the vendor said.

The Summit Laser-Base Filing System is priced at $39,500.

Summit Software, Suite N-202, 430 Tenth St. N.W., Atlanta, Ga. 30318.

Processors

Mupac Corp. has introduced the **CE series** and **CG series** of VME backplanes as well as a series of **Multibus II ILBX II** backplanes.

The CE series of on-board termination backplanes and the CG series of off-board termination backplanes are said to combine both the J-1 and the J-2 functions into a single 6U-height multilayer backplane. Prices start at $498.

The Multibus II ILBX II backplanes offer a six-layer design. They are available in two, three, four, five and six positions. Prices start at $145.

Mupac, 10 Mupac Drive, Brockton, Mass. 02401.

Scientific Calculations, Inc. has introduced the **ARX20**, a super-minicomputer for the 100% routing of printed circuit boards.

The ARX20 is said to be a peripheral processor configuration employing multiple dedicated algorithms for the total routing of a range of boards. As a network server, it can queue and route designs from many workstations. Dynamic monitoring of electrical and mechanical design rules provides multilayer routing of analog and digital or mixed boards. Spacing flexibility allows the definition of traces, clearances and vias of any size, the vendor said.

The ARX20 is priced at $75,000.

Scientific Calculations, 7635 Main St., Fishers, N.Y. 14453.

Micro Memory, Inc. has introduced the **MM-6240D** high-speed error detection and correction memory module for VME-bus systems.

The MM-6240D comes in capacities of 4M, 8M, 12M and 16M bytes. It detects and corrects all single-bit errors and detects and reports multiple-bit errors. It features a long-word 32-bit cache along with bank-interleave and block-mode transfer.

Other features include module selection on 64K-byte boundaries with switch-selectable starting and ending addresses in any 16M-byte bank. Also, address modifiers are decoded to allow 16- and 32-bit masters to access the memory.

Prices range from $1,995 to $6,795.

Micro Memory, 9540 Vassar Ave., Chatsworth, Calif. 91311.

Graphics systems

Tektronix, Inc. has announced the **4126 graphics workstation** said to feature three-dimensional stereoscopic viewing.

The 4126 incorporates a field-sequential stereoscopic viewing system with a liquid-crystal shutter display. The workstation consists of a 19-in. display with 1,280- by 1,024-pixel resolution and 2M bytes of memory. Users can choose up to 16 displayable colors from a palette of 16 million shades. Up to 256 colors can be added optionally.

The 4126 3-D stereoscopic graphics workstation is priced at $29,950.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Terminals

Esprit Systems, Inc. has announced a price reduction for its **Opus2** ASCII terminal.

The Opus2 offers Wyse Technology's Wyse 50 compatibility, video, pop-up calculator and enhanced keyboard features such as a separate cursor and numeric pad clusters. Other emulations include Televideo Systems, Inc. Televideo 910, 920 and 925.

The Opus2 is priced at $499.

Esprit Systems, 100 Marcus Drive, Melville, N.Y. 11747.

Wyse Technology has announced an **amber screen option** for its WY-30 and WY-50 ASCII terminals and WY-85 ANSI terminal.

The WY-30 is reportedly an entry-level terminal. The WY-50 is said to be a full-function terminal, and the WY-85 is a Digital Equipment Corp. VT220-compatible terminal.

The amber screen option is included in the list prices of all three of the Wyse terminals.

The WY-30 costs $399, the WY-50 costs $499 and the WY-85 is priced at $599.

Wyse Technology, 3571 N. First St., San Jose, Calif. 95134.

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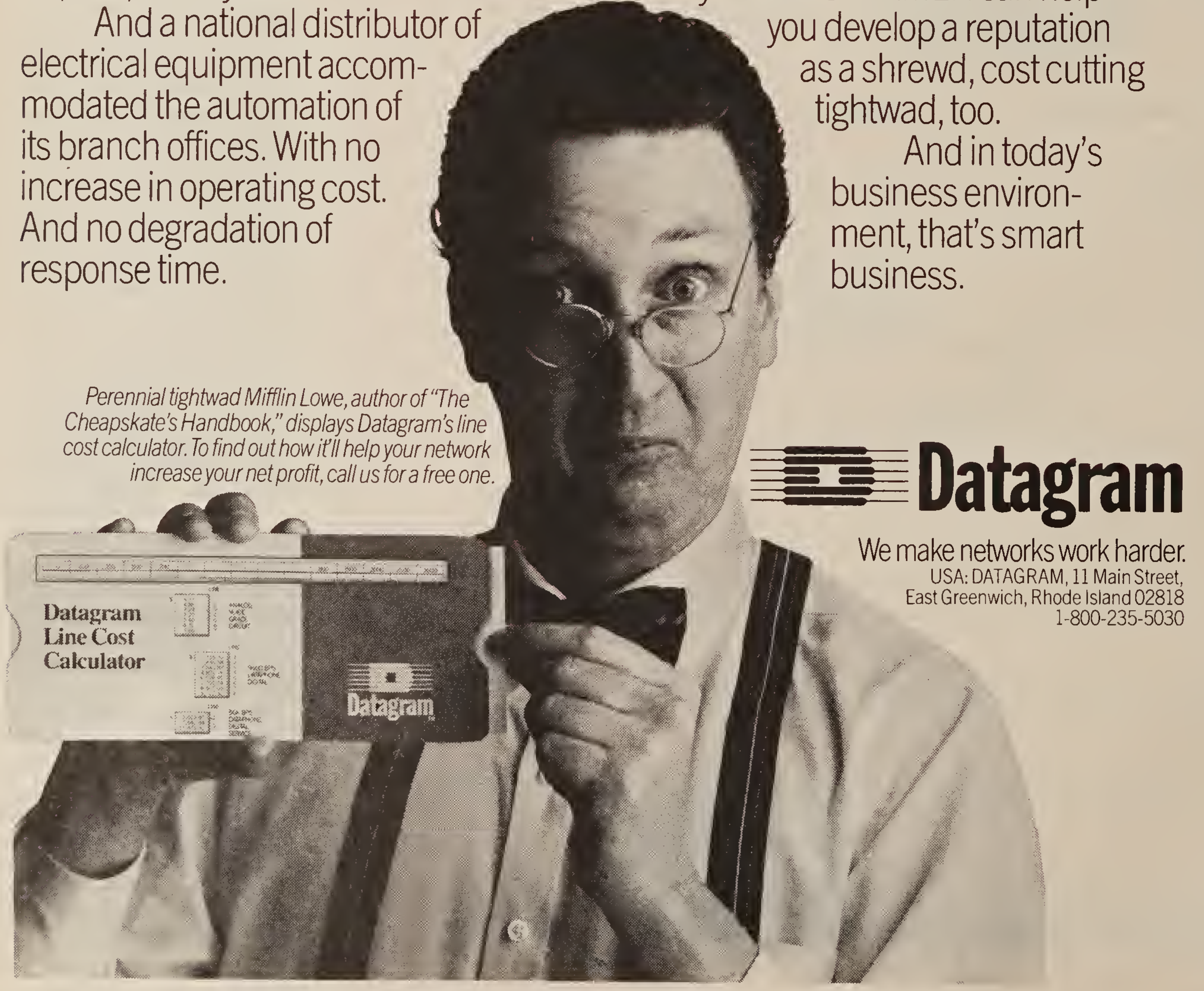

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Building malleable systems from software 'chips'

Object-oriented programming may do for code what Ford's assembly line did for cars

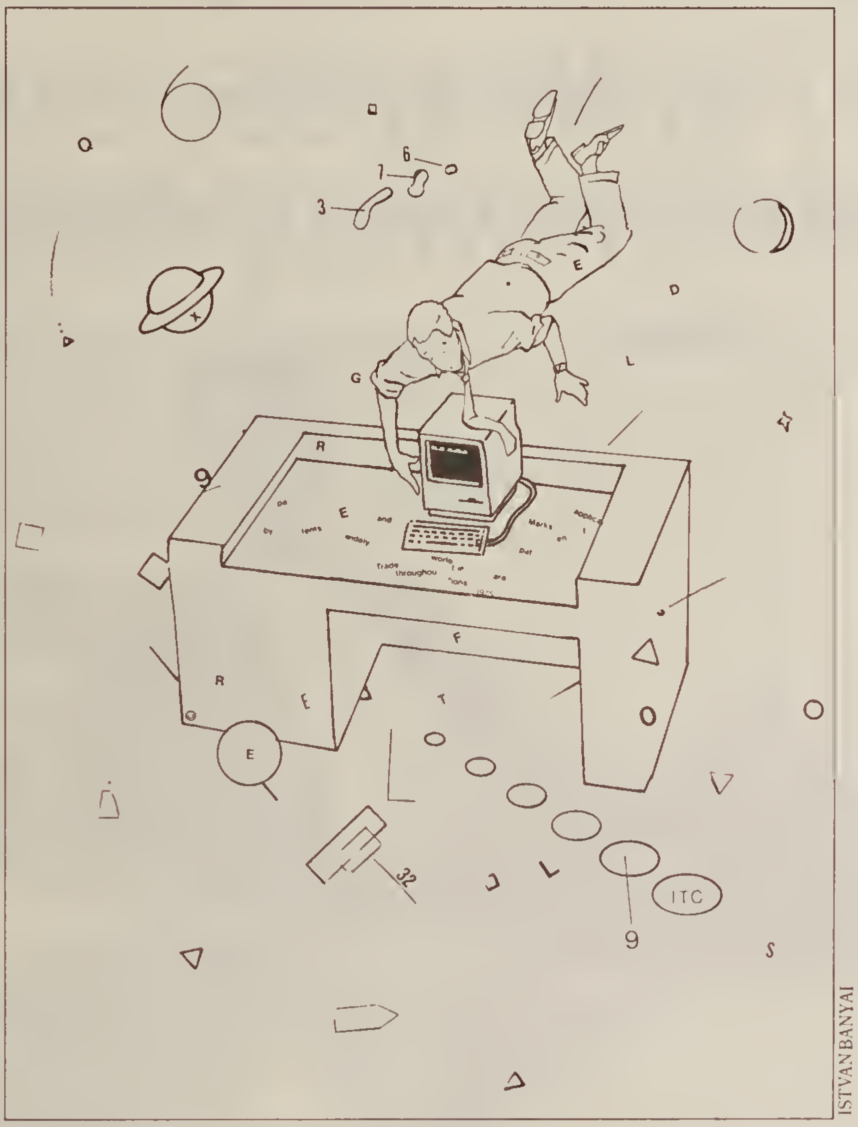
BY BRAD COX

Computers keep getting smarter, faster, cheaper. Every month we hear about the latest miracles in computers, satellites and communications. And we dream, as did the president of NEC Corp. in his Institute of Electrical and Electronics Engineers keynote speech, of what the total integration of computers, communications and mankind might mean to us all.

Twenty years ago, a single IBM 7094 served the entire University of Chicago campus. Today, I have more computing horsepower and memory on my own desktop. In 1970, it was newsworthy to link this IBM with minicomputers in laboratories across the street. Today, transcontinental electronic mail deserves only passing comment.

In only two decades, hardware engineers have undergone fundamental revolutions that have repeatedly changed their entire way of working. The first engineers developed computers by hand, using tubes and, later, discrete transistors, resistors and capacitors.

These were quickly replaced by board-level integration and then, in rapid succession, integrated circuits (IC), large-scale integration, very large-scale integration. Now they talk about wafer-scale integration. The cumulative effect? An exponential improvement in hardware capability during the past 20 years.



ISTVAN BANYAI

Can you identify a comparable revolution in the way software is produced? I cannot. Twenty years ago I learned to program in assembly language and then spent 20 years learning how to do the very same thing in Fortran, Pascal, C and LISP. While hardware engineers were learning to think in terms of modules whose size and power were increasing exponentially, software engineers continued to build programs as always: by choosing programming language statements one by one, putting them side by side to make a program.

Hardware engineers have discovered how to resuce each other's efforts — to stand on the shoulders of giants, instead of their toes. We have barely begun, and we really can't wait any longer.

We're already face-to-face with the software crisis — the awareness that ambitious software systems are too expensive, of insufficient quality, hard to schedule reliably and nearly impossible to manage. It is time for a revolution in how we build software comparable to the ones that hardware engineers now expect about every five years.

The revolution is object-oriented programming.

Software-ICs

Program-building tools (tools for programming in the small) emphasize the relationship between a programmer and the machine, and system-building tools (tools for programming in the large) emphasize the relationship between suppliers and consumers of code. Object-oriented programming is primarily a system-building tool because it puts reusability at the center of the software development process, making reusability the usual way that new components are built, instead of occasionally calling a function from some library, as programmers do now.

These reusable components are called software-ICs to emphasize the parallel to the way hardware engineers build circuits from a stockroom of generic, reusable silicon chips. A software-IC implements a class of objects, such as a class of envelopes or a class of file folders. It is a package of programming effort that is independent of the specific job at hand and highly reusable in future jobs.

Better yet, programmers seldom create new software-ICs

Cox is a founder and vice-president of Productivity Products International, Inc., a Sandy Hook, Conn., developer of tools and courses to make object-oriented programming an everyday tool in production programming. This article is excerpted from *Object Oriented Programming* by Brad Cox, © 1986 Productivity Products International, Inc. Reprinted with permission from Addison-Wesley Publishing Co.

- **These program 'chips' can be interchanged**
- **Happy ending to the software crisis?**
- **Don't fend off change — run circles around it**

from first principles. They develop new, specialized integrated circuits by describing only how they differ from older, generic ones from the stockroom.

Evolution, not revolution

Although the result may be revolutionary, the emphasis here is on change through evolution, not revolution. Object-oriented programming can be added to nearly any conventional programming language by grafting a small number of new syntactic features alongside the existing capabilities of the base language, but it provides the reusability and productivity of an object-oriented programming language. The hybrid retains both programming styles as tools to be picked up or laid aside according to the problem at hand.

Paradoxically, the oldest and most intractable program-building tools (such as Fortran and Cobol) are often used to build the largest and most complex systems. New systems are built when old ones become senile, and the new one must somehow be compatible with old code accumulated throughout the decades. These system builders need the machine efficiency and compatibility with existing code that traditional languages provide. But they also need help and need it now to cope with the complexity of the systems that are being built today.

Two hundred years ago, Connecticut was famous for its firearms and textiles industries. Many of the firearms companies are still there today; but the textile industry long ago moved elsewhere, and the old mill buildings have been renovated. In 1798, near the mill where this article was written, Eli Whitney introduced the cotton gin, an innovation that revolutionized manufacturing forever. Today, a similar innovation is under way that promises to do much the same thing for software.

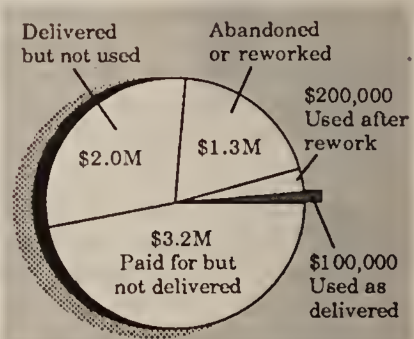
Before the industrial revolution, the firearms industry was not really an industry at all but rather a loose coalition of individual craftsmen. Each firearm was crafted by an individual gunsmith who built each part from raw materials. Firearms produced in this way were expensive, and each was the distinctive product of a gunsmith's personal inspiration. The revolution was sparked when Eli Whitney received a large manufacturing contract to build muskets for the government.

Whitney's innovation was to divide the work so that each part was produced by a specialist to meet a specified standard. Each gunsmith focused on a single part, using sophisticated tools to optimize that task. This produced economies of scale that drove down manufacturing costs, and best of all, Whitney's customer — the government — quickly realized that the standards would allow parts to be interchanged, greatly simplifying its firearm repair problems.

The importance of object-oriented programming is comparable to that of Whitney's interchangeable-part innovations for many of the same reasons. Both redefine the unit of modularity so that workers produce subcomponents instead of complete solutions. The subcomponents are controlled by standards and can be interchanged across different products. Programmers no longer build entire programs from the bare statements and expressions of a programming language. Instead, they produce software-ICs.

Software costs vs. results

The U.S. Government Accounting office 1979 report, (FGMSD-80-4) which breaks down results from $6.8 million in nine federal software projects, shows that only 2% of the software was used as delivered.



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CW CHART: SUSAN ALDAM

Of course, the industrial revolution was not a true revolution at all, except for those who paid no notice, until Whitney cornered the firearms market. For the winners, it was not a revolution but simply the culmination of a gradual process of evolutionary change. This same evolutionary process can produce a similar revolution in the software industry.

What is system building?

Harvey is the systems architect for Objective Solutions International, a well-funded start-up software company that hopes to win its fortune by making the electronic office a reality for large, paper-intensive customers like insurance companies, banks and government offices.

He is responsible for Objective Solutions' new office automation product, a state-of-the-art system that will apply distributed workstation and high-resolution raster graphics technology to handling

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arbitrary office forms such as while-you-were-out notices, office memos, price lists, insurance claim forms, loan request forms, driver's license applications and so forth, ad infinitum, because the set of data types that insurance offices handle are constantly changing.

Objective Solutions' customers are willing to pay for workable solutions to their paper-handling problems. But because of low computer skill level and rapid turnover, they insist that any computer-based solution emulate their existing paper systems as closely as possible, improving on it in speed and reliability. Computer-based forms must look and behave like existing paper forms, with preprinted text and rules that cannot be erased.

For example, conventional electronic mail systems are unacceptable because it would be too difficult to train workers to manage important forms with standard text editors. Besides, some customers are looking forward to enhancements that support integrated text, voice and even video annotations.

The firm plans to build a prototype system capable of demonstrating the concept for a few common office forms and to demonstrate this prototype to its customers. It would then contract to extend the prototype to support forms required by each individual customer and to keep the system up to date with the changing needs of its customers. The initial prototype would support a few forms chosen by Objective Solutions. Most of the development effort would be downstream, as additional forms are added over time.

Harvey is responsible for selecting, verifying and recommending a software architecture that would allow this ambitious system to be built and then extended without crippling losses to ripple effects as this complex system evolves over time.

A terrific plan, isn't it? It has something for everyone. Customers will like it because it directly addresses paper-handling costs and the difficulty of acquiring trained personnel. They could use this system to automate not only the forms but also the office procedures by which the forms are managed.

It could be extremely lucrative for Objective Solutions and its stockholders. The prototype would attract new customers, and it can expect a long-term repeat business extending to older installations as well. Change is eternal, and this firm is positioned for a long-term, highly profitable market.

Dream system

It is certainly an exciting opportunity for Harvey. Harvey has the lead responsibility right at the cutting edge of technology. This system has it all! It is highly distributed, uses high-resolution raster graphics workstations and provides an iconic user interface, each exciting in its own right. The forms will probably be produced using special-purpose forms-generation languages, and the automatic handling of office procedures will probably involve rule-based artificial intelligence technology, too. The development methodology will probably encourage rapid prototyping, probably mixed judiciously with a more formal, structured methodology. This system is a programmer's dream.

This system, of course, is possible. But unfortunately, it is not probable. The programming industry has a remarkably bad record of delivering systems less ambitious than even this one.

> THE REAL problem is that his project is beyond the state of the art. The software industry has not discovered how to produce systems that can survive the kinds of design changes this company must expect.

The probable outcome is that Objective Solutions' project will be canceled before delivering a single line of code, bringing disappointment to the customers, financial ruin to the firm and personal disgrace to Harvey. The fatal symptoms are uncomfortably familiar: over budget, behind schedule, out of control, low in quality, leading eventually to cancellation.

What makes Objective Solutions' system so ambitious? Hardware is certainly not the problem, because today's hardware is capable of supporting systems of this sort and more. Distributed systems are nothing new, nor are forms-oriented user interfaces, friendly or not. Nor are electronic mail systems, archival systems and workstations. Granted, these technologies have usually been exploited in isolation, not in combination, and combining them can certainly cause trouble.

The real problem is that this system involves an attitude toward change that is not provided for by our programming tools, methodologies and concepts. The firm's system is beyond the state of the art because the software industry has not discovered how to produce systems that can survive the kinds of design changes that this company must expect.

Change: The enemy

Harvey, as system architect, is responsible for defining the architecture of Objective Solutions' new system. But what does this mean? What should Harvey concern himself with, and what should be left to other team members? Certainly, architecture does not include coding. But does

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it include design?

Many architects would argue that Harvey should begin by selecting the hardware and software components of the system and deciding how they interrelate. They would have Harvey refine the hardware makeup of the system (workstations here, minicomputers there, mainframe over yonder), define which software components go where (forms editing here, departmental files there, archival and backup services over yonder) and choose a networking strategy for tying these pieces together. Refining this architecture into a detailed design would be done by others, with Harvey's advice and assistance.

But is this architecture or is it merely an early phase of design? Harvey is probably the first to look at this project with an eye to its technical feasibility, and his first responsibility should be to avoid the statistically likely danger. Of course, he cannot shirk the traditional concerns of the architect, because the project could certainly die from a slipshod, poorly documented architectural specification. But a brilliant decomposition into hardware, software and network components will do little toward improving the prognosis for this project. On a safari, it is usually appropriate to kill mosquitoes, since malaria is a valid concern. But is it inappropriate when the problem is stopping a charging elephant? Harvey is facing an attack by change, the largest and meanest antagonist any large software project can face, and his first efforts should be to defend this project from destruction by change.

There was a time when the virtue of software over physical media like paper and pencil was in its very responsiveness. Software was exciting because it was so malleable. The computer was a medium for creative inspiration, infinitely moldable to the programmer's desire. Nearly anything could be done with this wonderful stuff.

Although this may be to some extent true for small projects (program building), it is not and has never been true for ambitious undertakings (system building). In fact, software systems are usually the least responsive element in many organizations today. The organization as a whole is able to adapt more fluidly than the software upon which it has grown dependent.

The primary difference between programs and systems is in the ability of each to adapt to change. Programs are small, lightweight targets, and they can be relatively nimble and adapt as fast as conditions change. But large software systems are anything but responsive. They are large, complex and brittle, easily disrupted by the slightest impact from outside.

There are several schools of thought on what to do about this, the first firmly entrenched as the current dogma of software design; the others clamoring for attention from the sidelines.

Object-oriented programming languages

These languages have points in common, but their differences are dramatic. Binding is done entirely at runtime in Smalltalk, entirely at compile-time in Ada and can be done either way in Objective-C and C++. Inheritance is central to many of these languages but is missing in Ada.

Features	*Smalltalk-80*	*Ada*	*C++*	*Objective-C*
Binding time	late	early	either	either
Operator overloading	yes	yes	yes	no
Garbage collection	yes	no	no	possible (under development)
Inheritance	yes	no	yes	yes
Activation/ passivation	yes	no	no	yes
Multiple inheritance	yes	no	impossible	possible
Commercial availability	yes	yes	yes	yes
Software-IC libraries	yes	no	no	yes

CW CHART

The conventional strategy for dealing with change is to build elaborate defensive structures to prevent change altogether. Every software manager knows this one, chapter and verse. Software, especially large software systems, should be developed by first determining and documenting the system's requirements. The requirements are turned into specifications, and these are discussed with and ultimately approved and signed by the customer before further work is done.

Once the requirements have been frozen, a succession of designs are developed, reviewed and exhaustively documented as formal design specifications. Ultimately, the designs are transformed into code, a step that should be routine, assuming a sufficiently rigorous design process has been followed. Finally, the code is tested (in case a bug has crept in somehow) and ultimately delivered to the customer.

Maginot Line defense

Work must, of course, be scheduled carefully. Assuming this, the customer has to be happy with the result, since the delivered system will be precisely the system on which he signed off originally.

"Change the requirements? Preposterous! Look at these documents, with your signature at the bottom! The design will have to be redone! You'll disrupt the schedule! It will cost you extra!" The defenders lay down a withering fire from behind the barricades, and the forces of change crumple and fall. Heigh ho!

The glory is on the front lines. What remains is maintenance, a grubby activity that goes on out of sight in the back room, well outside the mainstream of exciting new development to which the really talented programmers gravitate.

Software is not at all like wood or steel. Its paint does not chip, and it does not rust or rot. Software does not need dusting, waxing or cleaning. It often has faults that need attention, but this is not maintenance, it is repair. Repair is fixing something that has been broken by tinkering with it or something that has been broken all along.

Conversely, as the environment around software changes, energy must be expended to keep it current. Holding steady to prevent decline is not maintenance. Evolution is changing in order to move ahead.

Harvey should probably ignore maintenance as a murky nonissue, but he cannot ignore repair and certainly not evolution. His competitive edge depends on being able to evolve that product to meet the changing needs of his customers. But precisely what should he do?

He could make sure that the code has lots of comments. He could make sure that the programming language is readable (whatever that is). He could outlaw GOTOs (for whatever good that is supposed to do). He could write lots of internal documentation and try to keep that up to date with code that is changing all the while. But would doing these things really affect the technical feasibility of this system?

Probably not, because these nostrums do not address the root problem: that the real world actually does change, and the Maginot Line defense tries to deny it. The Maginot Line attitude permeates nearly all of the programming industry's tools, methodologies and concepts. Programming languages make the programmer responsible for building source files that reflect the intended situation, while the compiler is responsible only for turning source files into hard code. The generated code can be extremely efficient because it is not responsible for anything more than the situation described by the programmer. But this code is brittle and unmalleable, efficient but unable to withstand impact from outside. The Maginot Line attitude makes malleability the responsibility of the programmer, not his tools.

Swiss defense

The Maginot Line mentality manages change by trying to prevent it. When that fails — and it nearly always does fail eventually — the task of repairing the damage is passed off to the back room — to the maintenance team. The rest of the team moves on to the next project, while everyone tries to ignore the clamor as the maintenance team struggles to keep a ravening horde of changes from devouring these brittle and nearly unchangeable software systems.

Objective Solutions' business plan amounts to an explicit rejection of the Maginot Line defense. It plans to build a prototype product and to use that to attract customers who will pay it to change the prototype to suit needs. The firm cannot outlaw change or shove it off on a maintenance group. Its plan requires a radically different view of the software development process, one that addresses change as a vital and integral part of the overall software development process. Objective Solutions might plan to use something similar to Switzerland's defense strategy, a strategy dating historically from about the same time period as the Maginot Line. Rather than investing in expensive (and given their neighbors, unreliable) border defenses,

Continued on page 64

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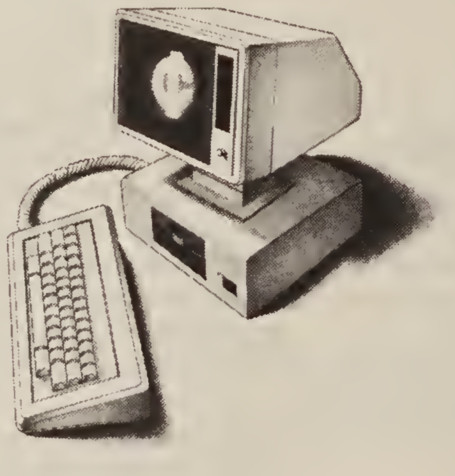

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Making engineering easy

BY JEFF WEINER

The premise of object-oriented technology is that software can be constructed from reusable components. In other words, software can now be engineered. This solves many of the problems that developers have faced for years, such as system maintenance, increasing development costs and system extendability. Four technical concepts form the basis of object-oriented languages and real software engineering: messaging, encapsulation, dynamic binding and inheritance.

Messaging. Traditional programming languages like C support the data/procedure paradigm. Data and procedures are represented as two independent components, and the programmer is required to manage their interaction. Active procedures act on passive data that the programmer passes to them.

As Kurt Schmucker points out in his book, *Object Oriented Programming for the Macintosh* (Productivity Products International, Inc., 1986), object-oriented technology combines data and the specific procedures that operate on that data into one entity called the "object." Rather than pass data to procedures, programs request an object to perform a procedure by sending the object a message. In object-oriented languages, procedures are referred to as "methods." Many different kinds of objects may recognize the same message but they may each implement that message in a different way.

Encapsulation. Encapsulation is like driving a car: To start, all the driver must do is turn the ignition key.

An object's data is hidden from other parts of the program and is visible only from inside that object. Only that object's methods directly manipulate the object's data. Method names and how to call them are visible to the user, but the implementations are not. Therefore, a method's implementation can change internally without affecting other parts of a program. Since data is encapsulated, programmers need only be concerned with what they want an object to do; the object can decide how to do it.

Encapsulation ensures an object's integrity. It shields data from other parts of the system, making each object an independent software machine that can be used in many different systems without changing working code. One object cannot know how information is organized within other objects; it can only request that another object perform some predefined action.

Many procedural languages support information hiding by providing a way to declare static variables within a procedure. Information hiding is similar to encapsulation, but in procedural languages the programmer must enforce it.

Dynamic binding. Message expressions are similar to function calls except that the decision about which method should be used to implement each message is made by the objects at runtime rather than by the compiler at compile time. This is called dynamic binding. It allows software systems to adapt easily to changing requirements.

Traditional function calls specify how a desired operation will be implemented statically at compile time. This means that each routine must know everything there is to know about all the arguments or files it will ever have to deal with during execution — a nearly impossible burden.

Objects decide at runtime which routine to run. For example, an arbitrary collection of objects might be sent a message to display themselves on the screen. Each object is sent the message display, but objects of different classes will run entirely different methods to accomplish that result. Since messages specify only what is desired, type dependencies cannot spread through a system because they become permanently encapsulated within classes. Therefore, programmers can install new data types in working systems, often without changing the rest of the system.

Inheritance. Inheritance is the technique that allows programmers to extend and modify existing code. Code is not written separately for every object; instead, programmers write code for classes of objects. Classes are created by inheriting all the variables and behaviors of a more general class, then adding specialized variables and behaviors. Inheritance allows programmers to create new classes of objects by choosing an existing class and specifying how the new class differs from that one, instead of starting from scratch each time.

Classes are organized hierarchically. Subclasses inherit the structures and behaviors of their superclasses. A "car" class might have a "vehicle" class as its superclass, meaning that all the methods and data previously defined for "vehicle" would be inherited by "car." The designer of the car class only has to describe how cars differ from vehicles. Generic functionality is developed once and used repeatedly throughout a system.

Some developers assume that object-oriented programming is complex. Actually, object-oriented programming is simpler than the procedural style of programming. It is such a natural style of software engineering; what a pity that the industry has waited so long to use it. •

Weiner is marketing communications specialist for Productivity Products International, Inc. in Sandy Hook, Conn.

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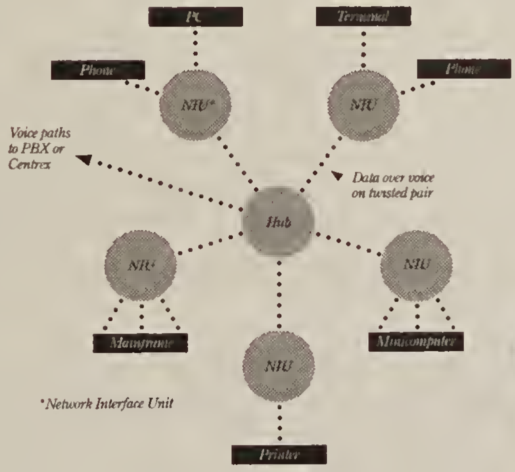

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Software 'chips'

CONTINUED FROM PAGE 62

Switzerland declared itself an open country and welcomed visitors from any country, race or religion. This policy allowed them to weather the world-shaking consequences of Word War II while collecting a tidy profit from all sides, simply by adapting to events responsively.

Can this defense work with software? Probably yes, because it has already been applied in several specialized, exceedingly complicated systems. Smalltalk-80, developed by the Software Concepts Group at Xerox Corp.'s Palo Alto Research Center in California, is one of the purest examples of this strategy, although in other domains, such as knowledge engineering, examples abound in which the Maginot Line defense is not tenable.

Smalltalk-80's designers produced a system that is capable of being bent in nearly any direction. The entire system, down to the hardware level, is compartmentalized into armor-plated objects that communicate by sending messages. There is no protected (and therefore unchangeable) operating system. The source for the whole system is immediately available on-line to any programmer, and that programmer's entire programming environment can be immediately changed in almost any manner just by changing a few lines of code.

Smalltalk-80 uses several tactics, particularly object-oriented programming, that provide new leverage for building malleable systems. But I do not advocate the Swiss Defense as a way of building large systems. Although the concepts of objects, messages, classes and inheritance provide great potential for building large yet malleable systems of the size that Objective Solutions is considering, there are several reasons why other parts of the Smalltalk-80 philosophy are almost certainly inappropriate for projects of this scale.

Machine efficiency is one rather obvious reason. Smalltalk-80 is hard on machine resources, spending computational power lavishly to provide productivity features such as automatic garbage collection, a highly graphic user interface and a uniform environment based on objects. Hardware cost is not the compelling objection it once was because costs are dropping so quickly. Nonetheless, Objective Solutions' customers can probably find other ways to use almost any amount of hardware power and are predictably reluctant to spend much of it on a comprehensive environment for the programmers.

Control is a more fundamental reason. Objective Solutions' system will involve large numbers of programmers who must work together as a coordinated organization if a system of this complexity is ever to be delivered. The ability for any programmer to change anything he likes is not a benefit for this kind of work, although the potential liability could be managed via Smalltalk's powerful set of change management tools.

Hybrid defense

Compatibility is the most fundamental, and nearly unfixable, reason. Nearly all modern organizations maintain at least some prior investment in software developed in older languages, and Objective Solutions' customers will insist that it continue to be viable. Short of providing separate hardware for these applications (possibly using Smalltalk-80 as a front end), there seems to be no way around the fact that Smalltalk-80 needs a complete, stand-alone environment unto itself.

> THE MAGINOT LINE mentality manages change by trying to prevent it. When that fails, the task of repairing the damage is passed off to the back room — to the maintenance team.

The hybrid defense is like the one preferred by a competent combat commander using every possible strategy in active combination. Defensive breastworks are used to defend important structures against frontal assaults; dispersed commando units are used to provide reconnaissance; maneuverability is used to avoid attack, if possible; and diplomacy and other peacetime tactics are used to avoid shooting in the first place.

Conventional software engineering dogma is to build efficient but brittle software systems surrounded by static defensive structures that protect them from change. The value of this is undisputed, since uncontrolled change, like hacking, is no way to build complex software systems. But even more can be done:

- Systems can be made malleable by retaining some elasticity into runtime. This involves relaxing the usual demand that everything be accomplished at compile time. Dynamic binding is a move in this direction (see story page 63).
- Systems can be made more changeable by making them smaller and lighter, thus transforming system-like functionality into program-like size. The encapsulation and inheritance techniques described later do this by integrating reusability into the mainstream of the software development process.
- Systems can be encapsulated more

"Part of my job is to put
into the hands of very
The idea is to give them
a science project."

Kevin Morrissey, Personal Computing Supervisor, GTE Corporation/Decision Support.

Now that the personal computer revolution has spread from the camps of the rebels to the rest of the population, there's just one question left: How to quickly initiate the uninitiated?

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tightly with objects that behave as armor-plated black boxes to limit the ripple effect when a penetration of the static defenses does happen. A change to one part of the system need not affect the rest of the system, but can be dealt with inside the part directly affected.

Object-oriented programming

This article offers no panacea that will magically eliminate problems of this magnitude. But it does propose several new tools and concepts that can help to produce software far more tolerant of change.

Encapsulation is the foundation of the whole approach. Its contribution is restricting the effects of change by placing a wall of code around each piece of data. All access to the data is handled by procedures that were put there to mediate access to the data. By contrast, conventional programming makes the consumer of each operand (defined by one of many suppliers) responsible for choosing operators (again, defined by one of many suppliers) that are type-compatible with the operand on hand.

Object-oriented programming moves this responsibility from the consumer to the operand and its supplier. These encapsulated operands are called objects. Whereas consumers once specified how each operation should be performed by naming a specific piece of code, they now specify only what should be done, leaving it to the object to choose code that is appropriate to its type or class.

Inheritance is the more innovative part of the approach because it is not provided by conventional languages. It is a tool for automatically broadcasting code to classes developed by different members of a team. Programmers no longer start each module with a blank page, but instead write a single statement that references some class that is already in the library. Each subsequent statement describes how the new class differs from the one in the library.

To see how these techniques apply to Harvey's problem, take a closer look at the capabilities of the prototype system and how they must change over time. The initial system will support a number of generic office objects. The prototype must demonstrate that Harvey's design meets the objectives described earlier. For example, it must demonstrate that these electronic objects can emulate the way familiar office objects behave and that the system can be extended with new office objects over time, as in the following examples:

- Container objects must hold arbitrary kinds of things, just as a physical office desktop does. For example, if I decide to mail a file folder instead of the usual memos, the system should not forbid it on the grounds that the mailbox designer intended mailboxes to hold only memos.
- Container objects must be able to contain arbitrary numbers of items, subject only to physical limitations of the machine. For example, workers who work best with cluttered desktops, even with hundreds of open items, should not be prevented from doing so.

Desktops, envelopes, mailboxes and file folders are loosely coupled collections, in which coupling refers to the degree to which the design of the collection depends on the design of its contents. Obviously, an electronic desktop cannot be redesigned and recompiled whenever a new kind of electronic object is added to it, since the user makes this decision at run-time. Furthermore, the repertoire of items that the desktop must hold will change over time as the system is extended with new kinds of office forms. However, some amount of coupling must occur, since an electronic desktop needs to interact with its contents.

INHERITANCE is a tool for automatically broadcasting code to classes developed by different members of a team.

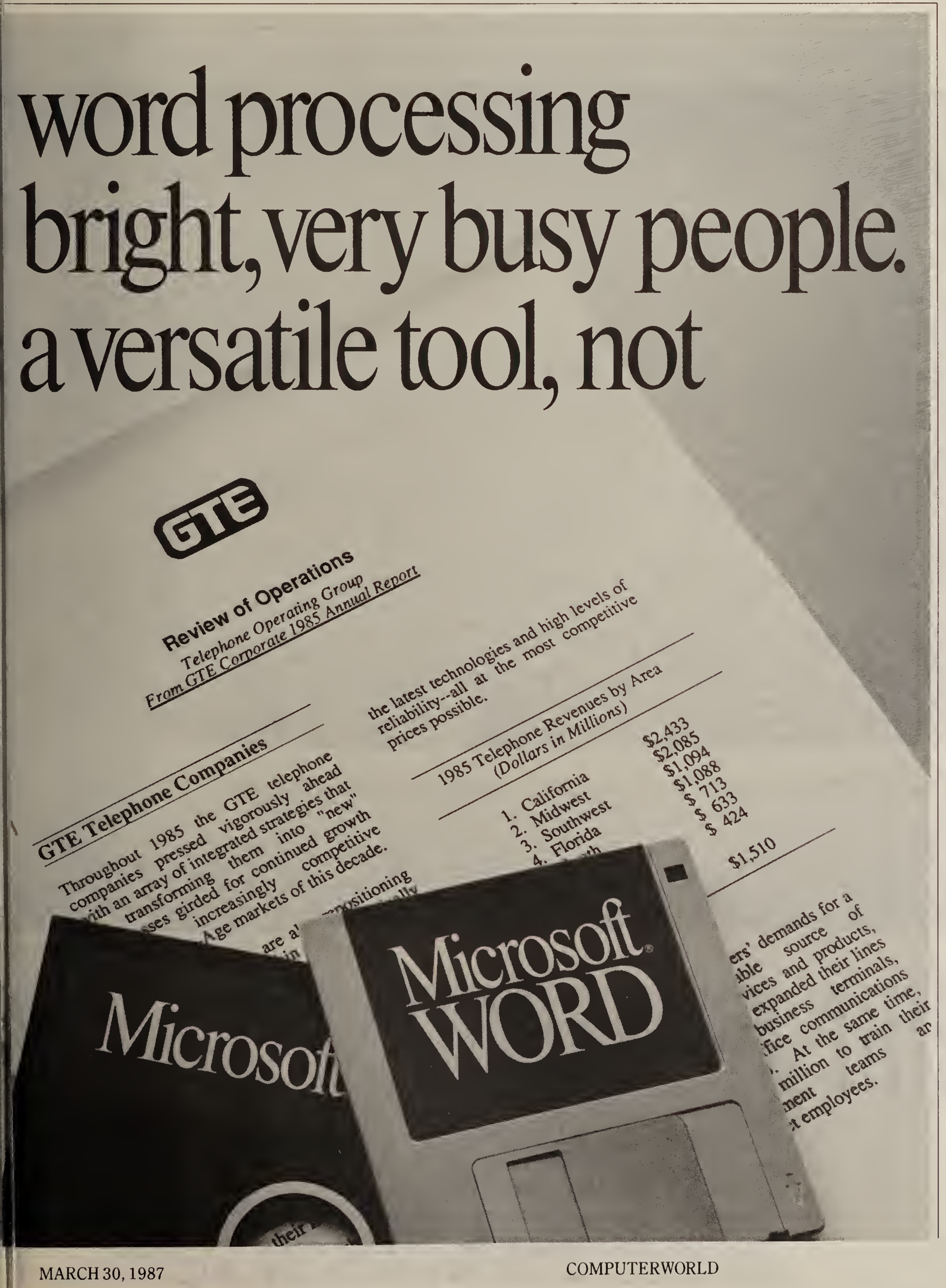
For example, suppose that the mailbox offers an option that displays a menu of current contents that help the user choose the next item for detailed reading. To implement this option, there must be a way to obtain summary information about any item that might appear in the mailbox, and this amounts to an operation that the mailbox must apply to its contents.

This class of problem is not easy to solve with conventional programming languages because conventional programming makes the consumer of an operand responsible for choosing the correct operator for the kind of operand on hand. In this case, the mailbox developer is the consumer for the items to be mailed. To get summary information from these items correctly, he must choose operators (functions) that extract the needed information from the various items somehow. The usual solution is to store the type inside each item in a standard place, like this:

```
struct item [int typeCode; ...]
```

and to test the type in a Switch statement. Based on the type of item, the mailbox can call the correct function for that type:

```
displaySummaryOf(next item)
    struct item *nextItem;
[
    switch (nextItem->typeCode) [
    case MEMO: displayMemo
        Summary(nextItem); break;
    case FILEFOLDER: displayFolder
        Summary (nextItem); break;
    case WHILEYOUWEREOUT
```



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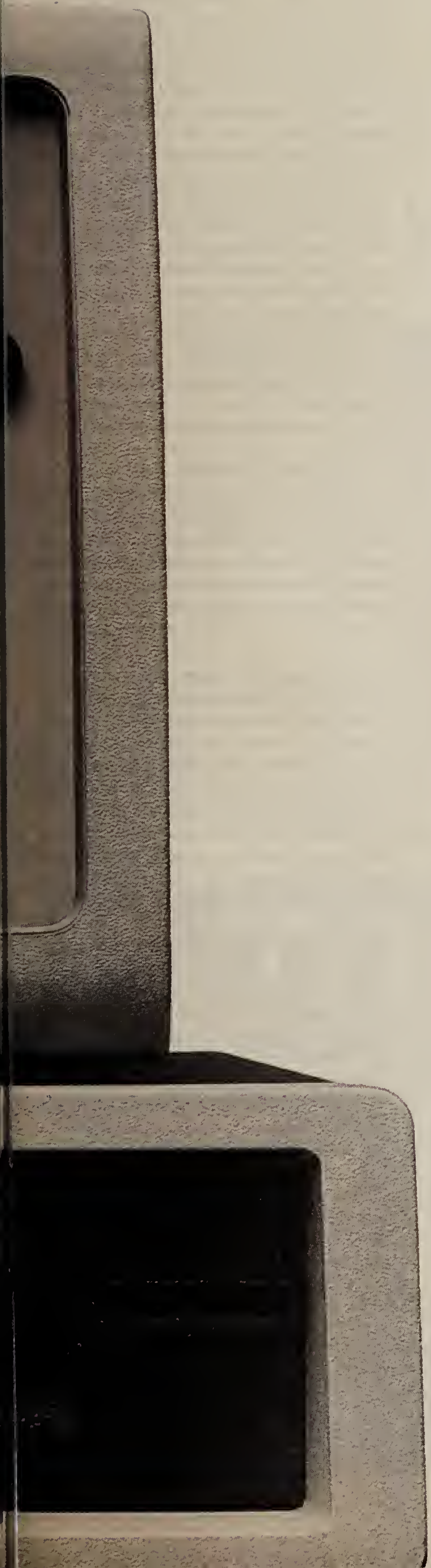

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```
    NOTICE: displayOutNotice
        Summary (nextItem); break;
    case ENVELOPE: displayEnvelope
        Summary (nextItem); break;
    }
    ...
}
```

> SINCE generic functionality can be developed once and used many times, inheritance provides a powerful boost to productivity. It quickly becomes unthinkable to develop code from scratch.

Notice what happens if Harvey actually tries to build a system like this. The mailbox code is now explicitly dependent on the kinds of items that were known when the mailbox was written; the case labels explicitly state that this mailbox will not work for contents other than

MEMO, FILEFOLDER, WHILEYOU WEREOUTNOTICE and ENVELOPE.

Something has crossed the boundary that should have separated what the mailbox developer is doing and what his suppliers are doing. Every time a new kind of data is added to this system, the mailbox code must be changed and recompiled.

Furthermore, these Switch statements are not localized in any way. They reflect the consumer's responsibility for choosing operators that are compatible with operand types, so they appear throughout the system.

Every time a new data type is added, every single Switch statement must be changed to add a case for the new type. The ripple effect of even simple changes cannot be bounded; it spreads throughout the system.

Notice what happens when the responsibility for choosing how to implement each command is moved to the objects' supplier instead of their consumer:

```
displaySummaryOf(nextItem)
{
    [nextItem displaySummary];
    ...
}
```

This commands the object named nextItem to perform the command named displaySummary. The consumer doesn't know or care how nextItem performs displaySummary because that is the job of nextItem's supplier.

Shaping systems

Although different kinds of objects such as file folders, memos and envelopes may displaySummary in very different ways, the consumer's code need not care. When the system is extended with a new kind of item, the change does not spread beyond the code written by the supplier of that item. This encapsulation makes systems more malleable by restricting the amount of damage a change can cause.

Inheritance, by contrast, serves to broadcast useful effects throughout a system. Although desktops, file folders, envelopes and mailboxes are, on the face of it, different kinds of objects, they do share many things. They are, after all, just different kinds of containers. Inheritance allows their similarities to be described in one central place (a Container class) and broadcast to all the classes that behave like containers.

The desktop developer need not build these common properties. Instead, he describes how desktops are different from plain-vanilla containers. Envelopes, file folders and mailboxes are described in the same way.

Since generic functionality can be developed once and used many times, inheritance provides a powerful boost to productivity. It quickly becomes unthinkable to develop code from scratch because it is nearly always easier to inherit powerful, well-tested capabilities from a library of earlier work.

Into the mainstream

Eli Whitney is not remembered as the inventor of a better gunsmithing tool but for inventing a new way for gunsmiths to work together. The result was a revolution in firearms manufacturing that eventually spread to all of manufacturing.

Object-oriented programming is revolutionary in exactly the same way. Its primary new features can be summarized in two key words: encapsulation and inheritance.

Encapsulation means that the consumer no longer applies operators to operands while taking care that the two are type-compatible. Instead, the consumer tells the object what needs to be done, and the object chooses the correct operator from a table of things that the object knows how to do. The result is that the effect of adding a new kind of object does not spread beyond the place in which the new type is defined.

By contrast, inheritance is a way of defining some useful construct in a central place and then automatically broadcasting that construct to all the places where it could help. New functionality is no longer developed by coding each line from scratch but by inheriting some useful class and describing only how the new one differs.

The effect is to put reusability squarely in the mainstream of the software development process. •

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William R. Synnott

Fielding a triple threat

The evolution of systems during the past three decades has resulted in three distinct types of systems that can serve as a foundation for the creation of competitive information systems in support of corporate objectives.

The first generation of systems concentrated on automating the internal operations of a company. I call these operating support systems. The second generation was aimed at supporting management information needs — management support systems. The current generation focuses on customers. These are customer support systems.

These classifications reflect not only three different functions, but the need for different planning processes, development tools, staff support resources and methodologies. Operating support systems tend to be large, structured, third-generation language systems. Management systems may be small, unstructured, fourth-generation language prototypes. Customer systems could be either or both.

These three types of systems help achieve competitive advantage in different ways. Operating support systems are

Continued on page 72

Insurer seeks strategic DP

BY DAVID A. LUDLUM
CW STAFF

The creation of a higher level chief information officer reflects an upgrading of information systems from a service function to a strategic asset at Colonial Penn Group, Inc., according to Ronald C. Glidden, who has joined the insuror as executive vice-president.

Other reflections of the shift at the Philadelphia-based company include expansion of the information systems department, construction of an attractively situated facility for the department, a migration from a Honeywell, Inc. system to become an all-IBM shop and greater use of microcomputers.

"Colonial Penn recognizes the need to move systems from a service context to a major strategic asset. I was brought in by the president to head up a major strategic thrust to use data processing technology to gain a

Continued on page 72

Ronald C. Glidden

UPDATE

Kid gloves ease MIS merges

JAMES ENDICOTT

BY EDDY GOLDBERG
SPECIAL TO CW

On Feb. 7, 1986, Wells Fargo Bank, NA announced its acquisition of Midland Bank PLC's Crocker National Bank. On May 30 of that year, the two banks merged. James Kridel was fired, he remembers, at 10:32 a.m. on May 30. But he is far from bitter.

"It was a tremendous learning experience," says Kridel, who was Crocker's executive vice-president at the time of the acquisition. "Wells Fargo did a professional job and it was good to have a quick [transition] time. It was initially supposed to end in 18 months. They did it in three."

For Kridel, now executive vice-president of Glendale Federal Savings & Loan Association in Burbank, Calif., it was clear early on

Continued on page 70

Scholar says 'Don't await leading edge'

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — MCI Communications Corp. is financing a new center for researching MIS strategies that is headed by a management scholar who questions the need to use leading-edge technology to gain competitive advantage.

MCI has provided initial financing for the International Center for Information Technologies (ICIT), a for-profit organization founded last November and based here.

With a staff of 25 in Washington and six in London, the center is intended to sponsor original research, hold conferences and publish briefing papers designed to help MIS managers plan, manage and use information systems, according to Peter G. W. Keen, the center's executive director, in a recent interview.

Keen has been a management consultant to governments and corporations and served on the faculties of MIT as well as the Harvard and Stanford University schools of business. He graduated from Oxford University and earned advanced degrees at Harvard.

"Everything we'll do is research-flavored. Our goal is to make certain that the research is translated into something usable," Keen says of the center.

Continued on page 71

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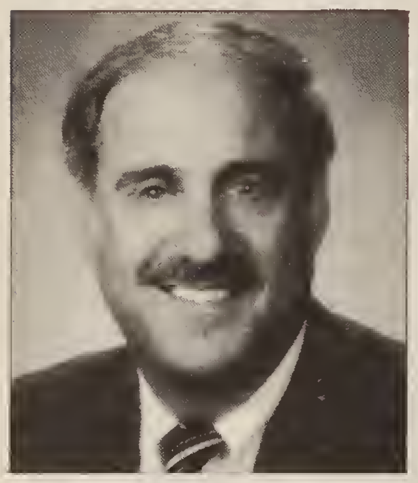
Kid gloves

FROM PAGE 69

that 80% to 90% of Crocker's data processing personnel were likely to be laid off. The acquiring bank had announced that it "would continue with the Wells Fargo culture in all departments," explains Wells Fargo spokeswoman Betty Lattie. Yet that corporate culture was significantly different from Crocker's. "It was a meeting of unlike species," Kridel recalls. Where Crocker had a centralized DP operation employing about 2,000 people working on complex systems, Wells Fargo had a decoupled operation with a relatively small DP function.



James Kridel

"While every Crocker employee was originally assigned to a Wells Fargo department, often the organizations were not parallel," Lattie explains. Layoffs were thus unavoidable, but Wells Fargo was determined to provide a thorough, helpful separation plan, she adds.

The story behind Wells Fargo's acquisition of Crocker highlights the difficulties that MIS managers caught in the throes of a merger or acquisition must face, namely: How do you resolve the differences between incompatible MIS cultures? How long should a transition take? How do you keep your work force productive when you face possible layoffs? How do you help your employees find new positions within or outside the company if it looks like layoffs are imminent?

Clash of cultures

In Kridel's case, two incompatible corporate cultures met, resulting in the disbandment of one, yet the process was handled professionally and with compassion for the well-being of those who were laid off. Preemptive moves such as publishing a newsletter and hiring a psychologist helped smooth the transition. Not all mergers and acquisitions, however, go smoothly.

One of the reasons is that not all firms have a clear transition strategy, and those that do do not always communicate effectively with the employees who fear that their lives are about to be disrupted.

If you face an acquisition, you can take several steps to prepare your staff for the months ahead. First, learn as much as you can from other firms that have been through the process. And second, remember that responsible management policies and a sense of cooperation will go a long way in smoothing the panic and uncertainty that accompany any merger.

General Electric buys RCA

DP breakup was the final decision for Crocker, but when one company acquires another it does not always mean the acquired firm's data center will be phased out. The opposite is happening with General Electric Co.'s acquisition of RCA Corp., which, at $6 billion, is the largest non-oil company merger in history.

At the time of the acquisition, which began in July 1986 and was completed in November, RCA was an experienced IBM shop while GE had a mix of Honeywell, Inc. and IBM data centers. To develop a strategy, Ed Skiko, then chief information officer at GE, met with Mike Cofone, his counterpart at RCA, to evaluate the strengths and weaknesses of the two operations.

When Skiko and Cofone completed their assessments, GE personnel were impressed enough by RCA's IBM data center that they decided to move GE's corporate information systems to RCA's center.

Cofone, who is now staff vice-president for RCA corporate systems and manager of corporate information systems and services for the combined company, says they realized that it made sense to take advantage of the impressive RCA center. "You can't look at [an acquisition] as who took over whom," he says. "That's why I think we were successful. It was a case of being able to combine our resources, and if you've got good resources you take advantage of them."

Ed Skiko

Skiko, now vice-president of corporate systems at GE, says the merger went exceptionally smoothly. He attributes the ease of transition to some fairly simple procedures.

"The plan was to make sure everybody was treated equitably, independent of which corporation they had started with," he explains. Skiko says this meant that when it came to allocating key jobs and deciding who was going to be displaced, "we didn't just take all the people from the new company and throw them away."

State acquires American

Merging two shops was not as simple when the American Savings & Loan Association in Irvine, Calif., was acquired by the State Savings & Loan Association in Stockton, Calif., in 1984. In fact, there was downright animosity as well as a slew of management problems to overcome, according to Tom Holm, who was senior vice-president at American's West Lake, Calif., data center at the time of the acquisition.

Now a managing principal at the JIA Management Group in Santa Monica, Calif., Holm looks back on the merger as a case in which two cultures clashed in the merger process with unfortunate results.

"The two associations were culturally quite a bit different," he says. State's culture was aggressive and entrepreneurial; American's was more conservative, he explains.

Each bank ran its own data center and each exerted tremendous resistance when it came to cooperating with the other shop. "It grew into an us-and-them situation — an antagonistic environment," Holm recalls.

To bring the two data centers together, State and American tried several approaches. One early approach was to determine the strengths of each center and divide the tasks accordingly, but problems arose as projects increasingly began to overlap. The second approach was to target specific assignments and write detailed goals for each center, but that did not work out very well either.

The animosity dissolved between the two groups only after each realized it had to work with the other and that the only way they could meet company goals was through a team effort. "We had to have joint projects," Holm explains. "As soon as we recognized this, it began to work." In retrospect, he says, what helped more than anything else was the pride in accomplishment that both sides felt when they participated in solving the problem.

Pride all around

For Crocker DP employees, pride was also a key factor. "We had put together some very exciting systems," Kridel says. But Wells Fargo had determined that everything from Crocker would have to fit in or go.

"All my operations were superfluous," he says, recalling a shared point-of-sale network that took more than two years to create. Wells Fargo had no need for the network and essentially threw it away. "When you match cultures, even good ideas are not necessary," Kridel admits.

Despite their near-certain layoffs, Kridel says his people kept coming to work each day, and their performance reached an all-time high during the acquisition process. "My whole management team was laid off, but they never let up," he says.

Why? Kridel thinks it was individual pride in something they identified with. "They didn't jump ship. They went down like professionals," he says.

Mike Cofone

There was also pride in the operation itself during the transition, despite the uncertainty and resentment of impending job loss. Kridel had to keep his department running smoothly. His operation accounted for $7 trillion a year in transactions and included such functions as electronic banking, automated tellers and check-processing software as well as what he says was the most sophisticated international payment system in the banking industry at the time.

The human factors

Kridel says his immediate concerns during the transition were not only keeping a high level of professionalism and performance, but also attending to the welfare and future of his personnel. Early in the acquisition process, he traveled with managers from Wells Fargo to other merged or acquired banks to see what they had learned.

"We came back with lots of experience in major consolidations," he explains. But the group could not agree on exactly what to do, other than to make the transition a fast one.

A number of steps were taken that Kridel says worked out extremely well in minimizing the negative effects of job loss, uncertainty and disruption.

For instance, the newsletter/memo system that he set up

Merger tips from the top

During interviews with systems personnel involved in mergers, *Computerworld* gathered the following list of MIS managers' tips on actions to take — and not to take — when companies are merged or acquired.

- Take a proactive stance. If top management does not involve MIS, it is up to MIS to get involved.
- Examine the strengths and weaknesses of each company's data center with an eye toward the combined corporations' long-range strategic direction.
- Avoid haste in the early stages. Software conversions, especially, should be approached with patience and caution. There is no dictum that says the two shops should be combined, nor is there one that says they should not.
- Factor in each shop's hardware and software applications. Aim to keep services to customers and employees running at previous levels.
- Pay attention to the corporate cultures of the two companies. The business management styles of a New York-based old-line financial firm may differ radically from the go-go style of a Silicon Valley start-up. Imposing an inappropriate management philosophy may kill the competitiveness of the firm being acquired or result in the desertion of key personnel.
- Try to retain employees who understand both the technical and business sides of the company's operations. Assign staff evaluations to the employees' managers who best know what goes on in their departments. Meet with managers and employees, both separately and together, to hear issues from all sides.
- Hold meetings often. Send out frequent memos detailing any changes in policies, procedures and plans. Allocate time for one-on-one sessions and, above all, keep on top of rumor control.
- Involve the human resources department, perhaps by setting up a supportive outplacement center. Encourage the use of the company's word processing and telephone equipment for those seeking new employment.
- Provide personal counseling in the form of industrial psychologists, financial advisers and simple hand-holding. This can go a long way in keeping morale up during difficult times.
- Encourage voluntary retirement, if possible. Transfers within the company are also a good option.

EDDY GOLDBERG

served as a central, authoritative source of information and rumor control. The additions of industrial psychologists, outplacement services and a crisis hot line for employees who were taking the acquisition and their imminent lay offs badly also helped.

Group sessions held for Crocker employees let them realize that others had the same survival worries. The sessions gave employees a forum for questions about benefits, pensions, salary grades and years of service — as well as personal survival questions, such as how to meet loan, mortgage and car payments.

In the end, Wells Fargo personnel had planned to do the actual layoffs, but Kridel insisted his people should do it. "I strongly recommend that people's current managers do the layoff," he says. "It's very important to go out with respect and dignity." He insists that only the managers who had been there could remember the long hours and dedication their staff members put in. Acknowledging their accomplishments in the exit process boosted their spirits, he says, and went a long way in helping the job-seeking process that followed.

At American and State, Holm says the greatest difficulty for the people caught in the merger wringer was not dealing with the facts, but with their perceptions. "Most of the time those perceptions were wrong," he says.

> "THE MERGER plan was to make sure everybody was treated equitably. . . . We didn't just take all the people from the new company and throw them away."
>
> ED SKIKO
> GENERAL ELECTRIC CO.

"The only way to overcome a negative perception is to have very open and flowing communications. As we got smarter, we brought all the parties together and listened. Communication is the key."

The importance of communication was also important during the restructuring of the GE/RCA MIS organization. Concerning layoffs, in raw numbers, many will go: When the companies merged, GE had about 200 people in the production side of its corporate data center and RCA had about 275. By the time the two centers are consolidated, Cofone estimates that about 325 will remain.

Jay Hayner, manager of GE's Schenectady, N.Y., information processing center, stresses the importance of straightforward, open communications in helping to minimize the hardship of layoffs. "People would rather be given bad news than live with uncertainty," he says.

After 20 years at GE, Hayner says he has established long-term relationships with many of the people who will lose their jobs. Most have a long service record with GE, and while some are opting for early retirement, not everyone has that choice or wants it.

How is Hayner handling the process? "Most people feel sorry for me," he says. "There's no way they'd want my job."

Goldberg is a free-lance writer based in Framingham, Mass.

Scholar says

CONTINUED FROM PAGE 69

The research reports will be available to the public, he says.

The financing from MCI, which is expected to amount to several million dollars, will not bias the research, Keen asserts. "For years, [MCI Chairman] Bill McGowan has been trying to create something like this, almost as his legacy to the Information Age," Keen says.

Keen, author of the book *Competing in Time*, published last year, said in the interview that MIS managers need to accept today's imperfect technology and get on with the job of helping their firms become more competitive.

Quick action is crucial, he says. It typically takes five to seven years to build a data network capable of providing a competitive advantage, so it is already too late to affect competition in 1990, he notes.

Keen suggests a business planning horizon of three to five years and says the effort requires a new type of MIS manager; one who has the proper mix of technical and business skills.

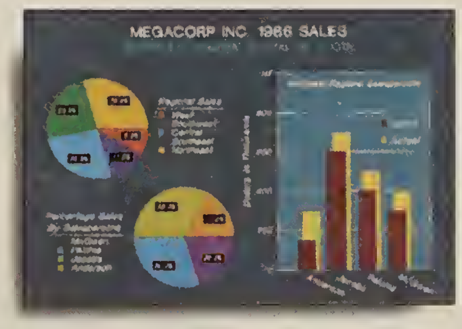
Peter G. W. Keen

More important than obtaining perfect technology or connectivity standards, Keen emphasizes, is the development of a competitive business strategy that exploits existing information technology.

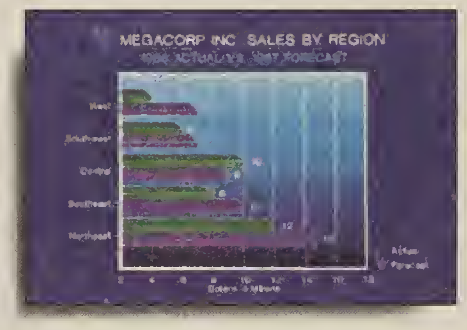
Organizations famous for using data networks for competitive advantage — such as Citibank NA, American Airlines and American Hospital Supply Corp. — have used relatively old-fashioned technology, not leading-edge technology, he asserts.

"At this point, there is more than enough good technology around . . . so that if you've got your business act together, you can get going. If you hope that technology is going to solve your lack of business strategy, you're asking for a fiasco," Keen explains.

Executive Assistant. Standalone PC; preformatted graph using Lotus® 1-2-3® data.

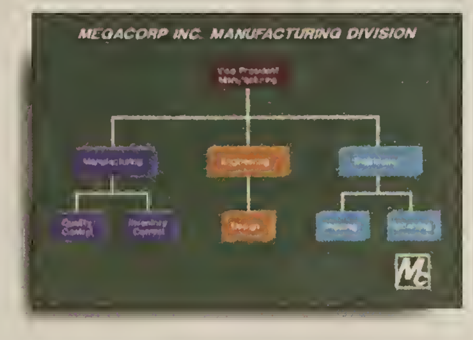


Regional Sales Manager. Departmental mini using data from PC.

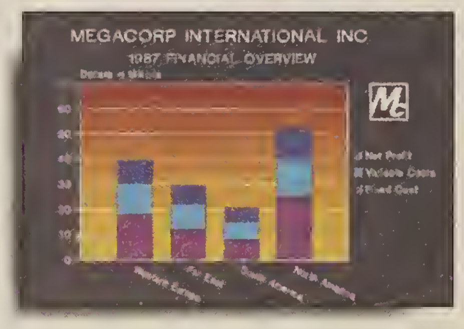


National Sales Manager. IBM PC off mainframe; data uploaded from mini.

Corporate Graphics Artist. Created using Editor at graphics workstation.



Vice President of Manufacturing. Departmental mini.



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Insurer

FROM PAGE 69

competitive advantage," said Glidden, who joined Colonial Penn in November 1986 from Life Insurance Co. of Virginia, where he was senior vice-president.

"With that, there's a lot of changes going on within data processing at Colonial Penn and our future looks both exciting and bright," Gliden said.

One change is the creation of his position, which consolidates the roles of the senior vice-president who previously was the top information systems officer and the executive vice-president to whom he had reported. According to Glidden, the senior vice-president, Bill Houspon, left the company. Another change is the expansion and reorganization of the data processing department. This will place more emphasis on applications software as opposed to hardware capacity, Glidden pointed out.

The expansion requires construction of a new facility, which will be located about five miles from the present one in Wayne, Pa., on a site at the edge of Valley Forge National Park, Glidden noted. "That's consistent with our strategy to elevate the position of data processing," he said. The building is to be completed by October 1988.

The replacement of a Honeywell 9092 system with an as yet undetermined IBM mainframe will allow greater use of standard application packages, freeing more resources for development, as well as cut costs, Glidden explained. Currently the company also runs IBM 3083 and 4341 processors.

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Fielding

FROM PAGE 69

aimed at reducing costs, saving jobs or increasing quality.

In other words, they focus on improving productivity. The chief information officer can use such productivity-driven systems to drive down costs and give the company a competitive edge as a low-cost producer. An operating support system supports, therefore, a productivity strategy.

Management support systems are developed in order to give managers faster access to better information for decision-making, business control, competitive and risk analyses, performance measurement and so forth. The information officer can support these important management information needs with support systems that provide highly responsive and flexible data base systems — usually through information centers — using fourth-generation languages and tools. But information can also add value to customers. Thus, it has a double-edged potential, depending on whether it is directed inwardly to the firm, or outwardly to customers.

A management support system, therefore, reflects an information services strategy.

Customer support systems are technology-driven products and services aimed at increasing market share and revenue. A customer support system reflects, thus, a strategy of technology innovation.

By focusing on the three types of systems that have evolved over time, the information officer can draw on these three parallel strategies to achieve competitive advantage: productivity, information and innovation.

Although each system type uses a different strategy, all hold the promise of creating value for customers and thus providing a competitive advantage. An efficient internal operating system can be extremely valuable to a business with a low-cost producer strategy.

A management system can provide valuable marketing and management information to both management and customers. And a customer-focused system can create product differentiation through technology innovation. Moreover, they are not mutually exclusive. Some systems projects present opportunities to achieve all three simultaneously.

Each can often be added on top of another — achieving cumulative benefits as competitive information weapons. In other words, not all systems fall neatly into one category. However, one is usually primary.

In my definition, if the target is information for competitive advantage, then it is a customer support system. If it is to support internal operations, it is an operating support system.

An airline reservation system serving customers is primarily a customer support system, even though it also automates record keeping operations and provides marketing and management information. An in-house information center is a management support system, even though it may provide customer information.

Opens opportunities

By applying the different types of systems to different types of computers, a variety of competitive opportunities open up.

For example, a management support system on a mainframe becomes an information center. On a minicomputer, it can take the form of a management decision support system. On a microcomputer it might be a spreadsheet application.

Different strategic planning methodologies are more effective than others with the different systems types. For instance, Business Systems Planning, the process developed and used extensively by IBM, best fits an operating support system because of its focus on identifying internal systems projects.

The Critical Success Factors method developed by John F. Rockart at MIT probably best fits a management support system, because it zeros in on management information needs.

Analysis methodologies such as those developed by the Boston Consulting Group, the GE/McKinsey model and the model developed by Michael Porter at the Harvard Business School best match a customer support system because of their market-driven competitive focuses.

In summary, the natural evolution of systems provides today's chief information officer with three important information weapon strategies to help his company achieve competitive advantage in the marketplace.

It only remains to exploit them, finding the right system strategy and system to best accomplish the business objective at hand. Winning companies today focus their competitive planning on all three strategies — increased productivity, new information services and technological innovation — in their quest for the leading edge.

Synnott is director of Information Systems and Services at Bank of Boston. This column is adapted from his book, *The Information Weapon: Winning Customers and Markets with Technology* (John Wiley & Sons, N.Y., 1987).

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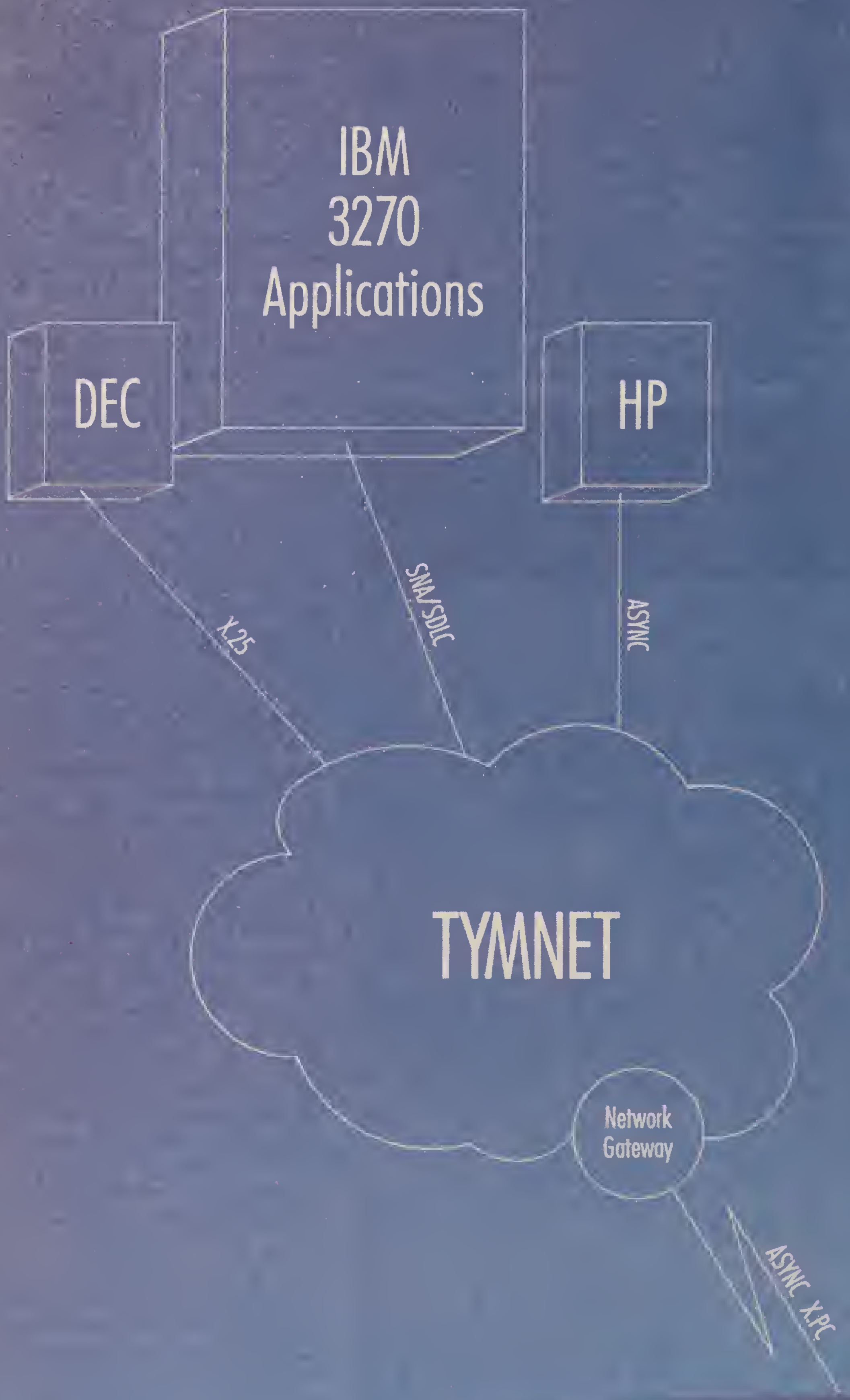

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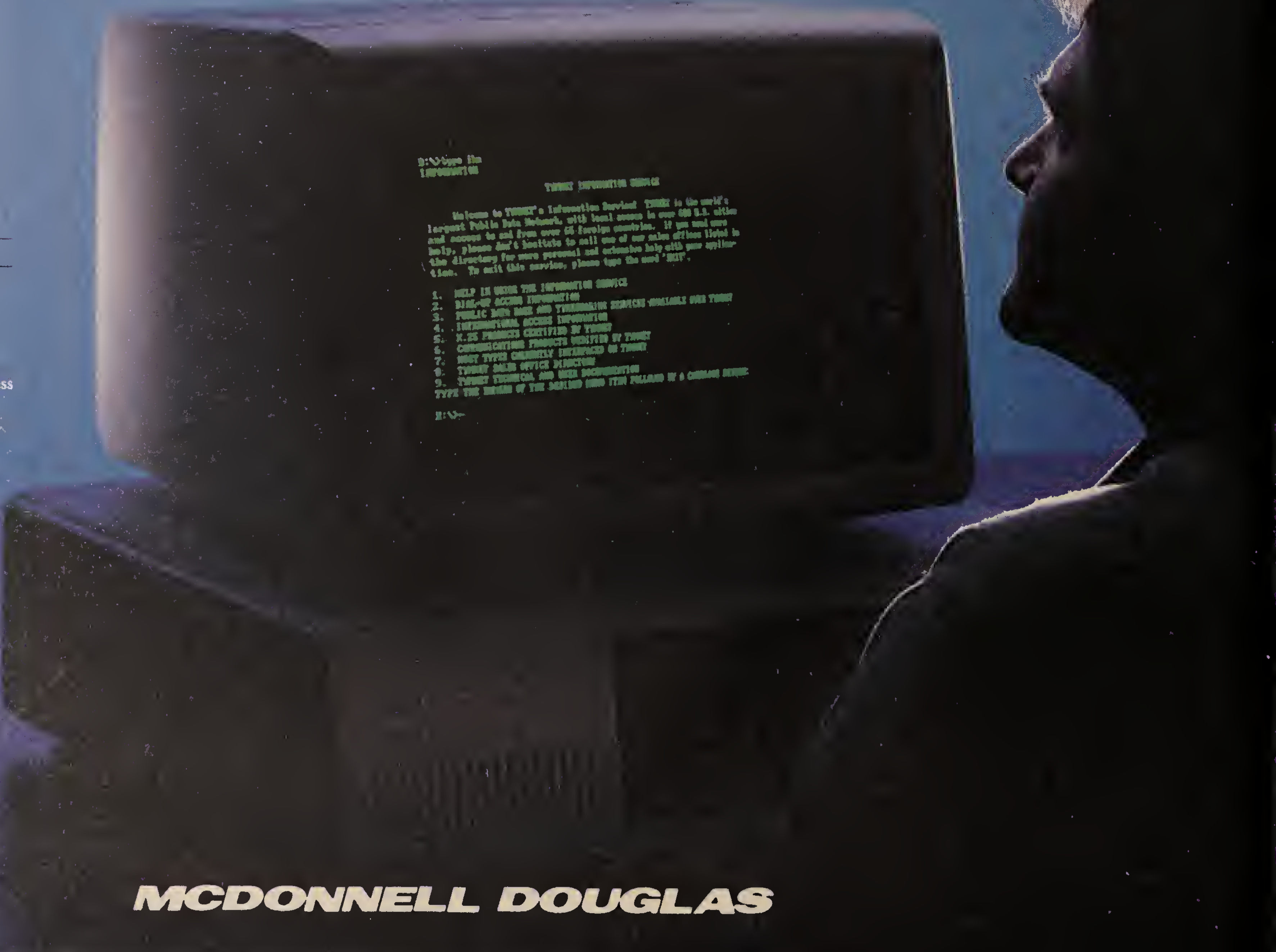

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IBM steps up run toward AI

IBM is moving rapidly toward becoming a major force in the emerging knowledge-based systems industry.

It is positioning its new Expert Systems Environment (ESE) as a strategic system designed to play a role in the integration of its major hardware and software product lines during the next few years.

At a special three-day consultants' seminar in New York recently, IBM executives discussed in detail the characteristics of current ESE program offerings and outlined their strategy to enhance the ESE product line in the immediate future.

At present, ESE is an expert system shell that runs on general-purpose IBM mainframes under the MVS and VM operating systems.

AI targets

It was designed to compete with major artificial intelligence tool vendors such as The Carnegie Group, Inc., Inference Corp. and Intellicorp, whose expert system shells were originally written in LISP and required specialized AI workstations to operate.

IBM executives asserted that IBM's Corporate New Business Development Group considered the development of a specialized IBM AI workstation but eventually dropped that approach in 1985.

Considerations

Ease of use, ability to run on general-purpose computers and good potential for integration with mainstream software and data bases were the overriding factors in the executives' decision.

The resulting ESE products consist of two complementary programs written in Pascal.

The Expert System Development Environment is used to build knowledge bases, while the Expert System Consultation Environment is used for consultations.

The ESE system runs on most IBM mainframes, including the 9370 family of computers. ESE can access external data bases by executing custom-

Continued on page 80

ADR battles IBM, slow market

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — In the 14 months since Applied Data Research, Inc. (ADR) was acquired by Ameritech, life at the IBM-compatible systems software house has been eventful, to say the least.

ADR, like other mainframe data base management concerns, is coming off a year that was not overly hospitable. Budget cutting at many corporations forced MIS executives to be extremely prudent in big-ticket software purchases, a situation that has made life difficult for ADR and its brethren.

At the same time, slackening sales of IBM hardware caused Big Blue to become more aggressive in the software arena. During 1986, IBM declared that DB2, its relational data base management system, was a strategic product. That pronouncement threw the data base market into disarray as users scurried to analyze the virtues of DB2 vs. IBM's IMS and competing products from ADR, Cullinet Software, Inc. and other vendors.

Redoubled efforts

But under former Ameritech executive Dennis Strigl, ADR has redoubled its efforts to remain the No. 1 alternative to IBM systems software. "We're taking IBM on head-on," Strigl said in an interview at ADR headquarters last week. "Some of our competitors, like Cullinet, have a different strategy — diversification — but we've chosen to stand and fight."

Despite publicly professing a hands-off approach to running ADR, Ameritech is said to be exerting more influence on the 27-year-old firm. Strigl, former president of Ameritech's celluar phone subsidiary, took over as ADR's president last fall. He replaced ADR co-founder Martin Goetz, who returned to the development lab by his own choice and remains senior vice-president and chief technology officer.

Although Chicago-based Ameritech does not break out the performance of its individual subsidiaries, ADR's sales were up 5% in 1986 from 1985's $150 million total, even after the effects of an accounting change and the impact of a new lease program were taken into account, company officials said. ADR, which was in the red for the nine-month period prior to the Ameritech acquisition, reportedly continued to lose money last year, although the situation is said to be improving.

Dennis F. Strigl

As part of Ameritech, the regional Bell holding company that reported more than $9 billion in revenue and $1 billion in income last year, ADR said it feels it has access to the resources that will enable it to succeed. Most important, ADR now has access to the deep pockets of its parent without investment community pressure to show increasing quarterly profits. This has enabled ADR to maintain heavy research and development investments.

Investments to increase

These investments, as a percentage of revenue, will increase from 19% to 20% this year, Strigl said. Robust R&D investment, he added, is paramount in the software business, since success usually correlates with technological innovation.

Much of ADR's effort is aimed at enhancing Datacom/DB, its relational DBMS. The firm said it intends to bring out new releases of Datacom/DB and Data Dictionary next month that will provide increased performance, security and ease of use for its relational DBMS customers.

The Ameritech connection has also enabled ADR to acquire technology to bolster its position in the data base race. The firm recently acquired relational data base management software from Software Systems Technology, Inc. in College Park, Md. The software gives ADR users access to SQL, a tool quickly becoming the standard means of defining and manipulating data within relational DBMSs, for the first time.

IBM's DB2 push has put pressure on competitors like ADR to devote more development and marketing resources to the rela-

Continued on page 78

Rodime continues drive suits

BY CLINTON WILDER
CW STAFF

SAN FRANCISCO — Rodime PLC recently filed its second lawsuit against a 3½-in. disk drive competitor, alleging that Conner Peripherals, Inc. is infringing on Rodime's disk drive patents.

The charges are almost identical to those in Rodime's current suit against 3½-in. disk drive market leader Miniscribe Corp. [CW, March 2].

Scotland-based Rodime said its attorneys have contacted more than 20 U.S. disk drive vendors using 3½-in. disk technology to inform them that Rodime believes they are infringing on Rodime's proprietary technology. Rodime said it is seeking to sell 3½-in. disk technology licenses to those vendors.

Rodime's finance director, Bill Batchelor, said several vendors that were contacted have expressed interest in licensing from Rodime, but no agreements have been announced.

A spokeswoman for San Jose, Calif.-based Conner Peripherals declined to comment on the suit.

Inside

- NAS's quarterly loss hurts parent company National Semiconductor. Page 79.
- NCR shifts focus from mainframes to modular systems. Page 81.

Wang signs deals with Diebold, Answer Systems

BY CLINTON WILDER
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc., continuing to expand its marketing beyond its own products, recently announced separate agreements with Diebold, Inc. and Sterling Software, Inc.

Under the development and marketing pact with Sterling's Answer Systems, Inc. division, Wang said, it will integrate its Professional Application Creation Environment (PACE) for VS computers with Answer/DB, a popular access tool for IBM data bases originally developed by Informatics General Corp. If the integration is successful, VS users will be able to access DB2, IMS and VSAM files on IBM mainframes, according to Wang.

DB2 is the second IBM-resident data base management system targeted by Wang for access by VS users. Last fall, Wang announced the integration of PACE and Cullinet Software, Inc.'s IDMS/R through a product called the PACE/Cullinet Connection [CW, Sept. 29, 1986].

"We recognize that many customers have made major investments in data and applications on IBM and IBM-compatible mainframes," said Jeanne Friedman, Wang's senior product manager for data base and decision-support products. "We want to allow our customers to leverage these investments within the framework of Wang's data management and information processing solutions."

Wang did not specify a target release date for integration products developed with Answer Systems.

Separately, Wang inked a private-label OEM agreement with Diebold, the Canton, Ohio-based vendor of automated teller machines (ATM) and other funds-transfer products. Wang will sell Diebold ATMs, point-of-sale terminals and other related products under the Wang label in the U.S. and selected overseas markets. Financial terms of the agreement were not disclosed.

Wang will become the first OEM to resell Diebold ATMs under its name, according to a Diebold spokesman.

Wang, trying to climb back from the worst slump in its history during the past two years, has recently been aligning with vendors in markets other than its traditional markets of office automation and minicomputers. Under an agreement signed last fall, Wang is currently developing software to link VS systems to workstations from Apollo Computer, Inc. and Sun Microsystems, Inc. [CW, Oct. 6].

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Oracle reports earnings boom

BY ALAN J. RYAN
CW STAFF

BELMONT, Calif. — Oracle Corp. reported a 118% increase in sales and a 136% rise in earnings for its third quarter of fiscal 1987, which ended Feb. 28.

Sales for the period were $34.9 million, with income reaching $4.8 million, or 16 cents per share.

For the like quarter in fiscal 1986, the company posted sales of $16 million and income of $2.1 million, or 8 cents per share.

The earnings per share were adjusted for the company's recent two-for-one stock split. Pre-stock split earnings increased 31 cents from 15 cents for the quarter.

Oracle President and Chief Executive Officer Lawrence Ellison said that, including third-quarter earnings, the company has had sales in excess of $100 million for its last four quarters.

Recognize the value of SQL

Ellison said the strong quarter indicates that customers recognize the value of SQL as an industry standard and the strong worldwide demand for the company's relational data base software on mainframes, minicomputers and personal computers.

Nine-month sales increased 134% to $80.9 million, compared with sales of $34.5 million in the first nine months of fiscal 1986.

Earnings for the three quarters were up 142% to $8 million, compared with $3.31 million in the like period last year.

Rabbit plans CTI merger

BY CLINTON WILDER
CW STAFF

MALVERN, Pa. — In its second acquisition in as many weeks, Rabbit Software Corp. last week announced plans to merge with CTI Data Corp., a Raleigh, N.C.-based vendor of micro-to-mainframe gateway products.

The firms said the acquisition will broaden Rabbit's array of communication products that link smaller computers to IBM mainframes using IBM communications protocols.

CTI's products allow non-IBM-compatible micros, coaxial controllers and ASCII terminals and peripherals to interface with IBM mainframes.

Two weeks ago, Rabbit acquired Micro Plus II, Inc., a Boca Raton, Fla.-based vendor of communications products for IBM Personal Computers.

Rabbit said that like Micro Plus II, CTI will operate as a subsidiary of Rabbit. CTI President and Chief Executive Officer Richard O'Bey will continue to head the business, the company added.

Rabbit said it will issue CTI shareholders 200,000 shares of Rabbit common stock. Rabbit will purchase Micro Plus II for about 2 million Rabbit shares.

ADR battles IBM

CONTINUED FROM PAGE 75

tional data base management market. "DB2 has sure made life difficult for all of the independents," said Ellen Staelin, an analyst at International Data Corp. (IDC), a market research firm in Framingham, Mass.

Strigl called DB2 an "inferior product," and suggested that if customers benchmark it against Datacom/DB, ADR wins hands down. "If customers don't take the time to analyze our product, then we have an uphill battle," Strigl confessed. "But if they look at Datacom/DB with development tools like ADR/Ideal on top of it, then there's no problem."

"Clearly, DB2 is strategic to IBM," added William Clifford, executive vice-president. "But we say, 'Is it strategic for the customer?' "

Although the industrywide slowdown shows little sign of abating, ADR officials said business conditions are improving. The firm pointed to a recent $7 million contract signed with 3M Corp. and a deal potentially valued at $850,000 with Volvo AB SWE as positive signs.

"Compared with Cullinet, ADR has done reasonably well," IDC's Staelin noted.

The advent of the IBM 9370 — a mid-range computer running applications developed for Big Blue's 370 mainframe architecture — is expected to be a boon to software houses like ADR. The firm recently agreed to supply Triad System Corp., a turnkey systems vendor serving the automotive aftermarket, with data base management software and development tools for the 9370.

"We have a program focusing on the the value-added reseller market," Strigl said. "We intend to play a meaningful role in serving niche markets, and the 9370 will help make that possible."

Such is ADR's love/hate relationship with IBM, Clifford said. A healthy IBM is important to ADR so it can sell more software. Yet a dominant IBM prevents independent software houses like ADR from thriving.

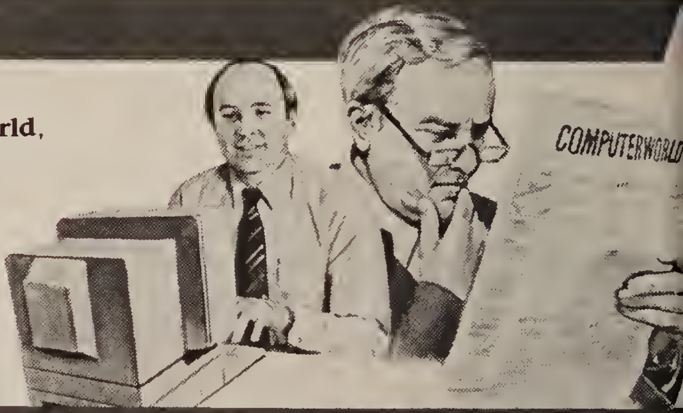
"One has to remember that IBM is a powerful company, but they're not invincible," Strigl concluded.

How to take the high risk

SAN FRANCISCO, CALIFORNIA • 8:15 A.M.

An in-depth cover story by Jim Connolly, in International Data Group's weekly, **Computerworld**, immediately arouses the apprehension of the Chief Information Officer (CIO) of an international company headquartered in California. The new minicomputer system his Information Services Team plans to purchase for their international offices is reported to be experiencing an alarming rise in downtime.

A multi-million dollar decision hangs in the balance.



FRAMINGHAM, MASSACHUSETTS • 11:20 A.M.

The CIO calls International Data Corporation (IDC) Vice President Frank Gens, who sets in motion an international study of the operating record of the minicomputer at its user sites, worldwide.

FRAMINGHAM, MASSACHUSETTS • 12:30 P.M.

Rebecca Segal, director of **IDC's Customer Service Program**, quickly assembles a task force which combines the talents of IDC researchers and analysts, and CW Communications, Inc. editors and reporters.

Computerworld Editor Bill Laberis and industry specialist Pete Bartolik, begin scrutinizing **CW Communications' News Network** database to retrieve pertinent information about the computer system in question from IDG's 85 publications around the world.

EUROPE, ASIA, SOUTH AMERICA • 2:00 P.M.

IDC field researchers in 12 countries interview the users of the minicomputer, review their usage patterns, examine work loads and determine levels of support available from local service personnel.

NAS loss burdens parent

BY ALAN J. RYAN
CW STAFF

SANTA CLARA, Calif. — Analysts last week said losses posted by National Semiconductor Corp. for its third quarter, which ended March 8, stemmed mainly from the company's National Advanced Systems Corp. (NAS) group.

"NAS is where all the revenue decrease came from," said analyst Paul Johnson of L. F. Rothschild, Unterberg Towbin. "The company assures me that that's all due to the seasonal factor, and related to some new product introductions from IBM."

"I thought they would overcome the seasonality, but they didn't," said James Barlage, an analyst at Smith Barney, Harris Upham & Co. "The problem was that in late December or January, their order rate at NAS was impacted by impending IBM product announcements. It hurt orders and shipments for the quarter."

Barlage said that after the IBM product announcements, shipments snapped back and hit near-record levels heading out of the quarter. "It looks like the momentum has been re-established."

National Semiconductor reported a loss of $25.6 million, or 31 cents per share, for its third quarter. That compares with a loss of $39.4 million, or 47 cents per share, in the like quarter of 1986. It was the company's eighth consecutive losing quarter.

Sales for the period were $398.1 million, compared with sales of $322.3 million in the year-earlier period.

The results include a charge of $15 million related to the restructuring of the company's Datachecker Systems and Semiconductor Group manufacturing operations announced in January.

Barlage said he expects "pretty good recovery in the current fourth fiscal quarter, due in part to the company's year-end tendency to ship more products and because of improvements in the industry."

out of high tech decisions.

SYDNEY, AUSTRALIA • 9:55 A.M.

Len Rust, managing director of IDC Australia, and the CEOs at 11 other IDC international research offices evaluate the field researchers' findings and compare them to the current minicomputer maintenance and support experience for various brands in their markets.

FRAMINGHAM, MASSACHUSETTS • 4:00 P.M.

The preliminary findings arrive via fax, telex and E-mail to be analyzed by IDG's project task force. IDC Senior Analyst Tim Caffrey writes the final report which points out that the minicomputer in question is experiencing a high failure rate, and the supplier's maintenance teams in seven key countries are not adequately trained to keep it up and running.

SAN FRANCISCO, CALIFORNIA • 5:45 P.M.

Based on the study's findings, the CIO decides to cancel the previous purchase order, and asks that his Information Services Team make an alternative purchase based on IDC's maintenance assessments and recommendations.

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3Com just gets stronger

BY ALAN J. RYAN
CW STAFF

SANTA CLARA, Calif. — Analysts last week credited 3Com Corp.'s 78% earnings increase for its third quarter to generally strong industry conditions, the demand for its local-area network and increased orders from retailer Businessland, Inc.

Paul Sherer, an analyst with Robertson, Colman & Stephens in San Francisco, said he thinks 3Com's growth will continue in upcoming quarters. His forecast for 3Com's fourth quarter is "a little under 10% sequential revenue growth to $32 million, with earnings staying relatively flat due to new product introduction costs," he said.

A second analyst said that because Businessland is placing many orders through 3Com, business will continue to grow in upcoming quarters.

For the most recent period ended Feb. 28, the company recorded sales of $30.4 million, an 81% increase from sales of $16.9 million reported in the same quarter of 1986.

Earnings for the period were $3.2 million, or 22 cents per share, compared with earnings of $1.8 million, or 13 cents per share, in the 1986 third quarter.

3Com's recent public offering to sell 1.2 million shares of its common stock was completed at $23.50 per share, Sherer said.

European chip firms to unite

BY AMIEL KORNEL
SPECIAL TO CW

CATANIA, Italy — Pasquale Pistorio, president of Italian semiconductor maker SGS SpA, has confirmed that the Italian government is negotiating the firm's merger with the chip division of France's state-owned electronics conglomerate Thomson-CSF, S.A.

IRI-Stet, the state-controlled industrial holding company that owns SGS, acknowledged that negotiations were under way to create what would be Europe's second largest chip maker.

SGS officials, who were in Catania inaugurating a $77 million research center for advanced semiconductors, seemed surprised at the timing of the announcement. They maintained that negotiations were in the hands of the government.

SGS recently revealed that it more than doubled its losses in 1986 to $50 million on sales of $375 million. Thomson's semiconductor division expects to post 1986 losses of $33 million, on sales of $436 million.

In 1985, Thomson purchased the assets of troubled U.S. chip maker Mostek Corp. from United Technologies Corp. for $17 million.

Kornel is European bureau chief of the CW Communications International News Service.

IBM steps

CONTINUED FROM PAGE 75

ized Pascal routines developed by the knowledge-base builder.

IBM also developed a high-performance expert system shell called Hiper at the AI Technology Center of its Federal Systems Division. It is a high-performance expert system operating at speeds a magnitude faster than the commercial ESE products.

The Hiper shell can be used as an embedded system in applications for satellites, the Strategic Defense Initiative, the National Aeronautics and Space Administration, large data base transfers and various intelligence agencies.

The Hiper system is not available as a separate product for sale to individual customers, but there is little doubt that lessons learned in deployment of such systems may eventually be put to good use in further enhancements of the ESE product line.

IBM is on the verge of announcing the upgrading of ESE to a program product from its current program offering status. Big Blue's immediate priority is to convince its mainframe users that IBM is committed to support and enhance AI products such as ESE for the long run across the spectrum of its hardware and software products.

High on the list of priorities is the development of better interfaces for ESE to connect with corporate data bases. Before the end of this year, IBM hopes to announce direct ESE links with Structured Query Language and DB2 products.

> BIG BLUE'S immediate priority is to convince its mainframe users that IBM is committed to support and enhance AI products for the long run.

Further down the line — but expected before the end of 1988 — are ESE links with IMS DB/DC data base products, which account for more than 40% of all mainframe data bases in existence today.

Another priority of the ESE product cycle is to bring expert system capabilities to all IBM intelligent workstation levels. At present, ESE uses the 3270 series of terminals.

The IBM Personal Computer with appropriate emulation cards is not ideal, because the ESE system relies heavily on use of 3270 terminal function keys that are not available on PC keyboards. During 1988, however, IBM intends to have a complete ESE version for the IBM PC, PC XT and AT models.

The IBM RT PC workstation has not been forgotten. This year, the company plans to announce a LISP language that will make the RT PC directly competitive with other AI workstations on the market.

A full version of ESE for the RT PC is also expected to be available in 1988. In addition, ESE versions are also planned that year for IBM's midrange computers of the System/34, 36 and 38 series.

IBM revealed that "several score" of ESE systems have already been deployed, primarily among its Fortune 500 mainframe end users. Some that have been identified include such companies as Chase Manhattan Bank N.A., Citicorp, Du Pont Co., McDonnell Douglas Corp., Timeplex, Inc. and Travelers Insurance Co. IBM also developed close to 100 in-house applications of its ESE system, some of which, involving graphic end-user interfaces, were demonstrated at the seminar on-line.

Szuprowicz is president of 21st Century Research in North Bergen, N.J.

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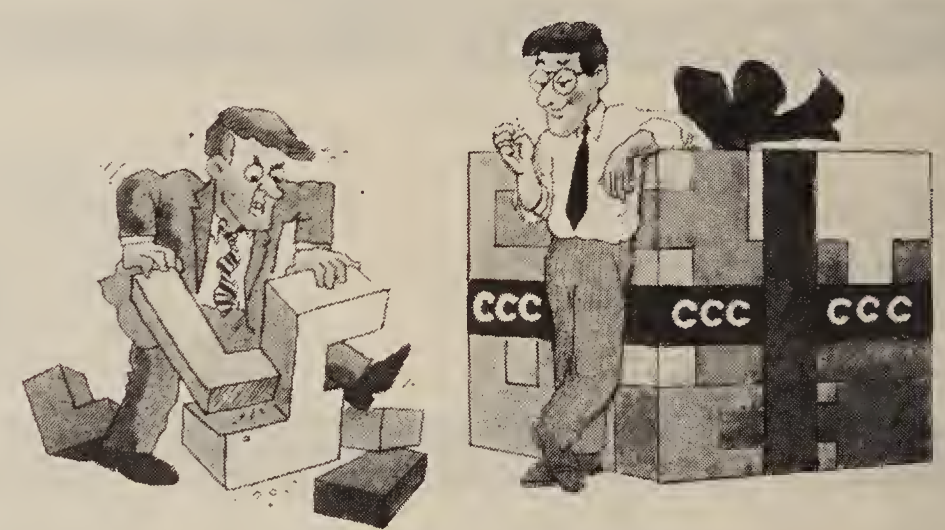

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NCR's mainframe-to-modular move

BY JAMES CONNOLLY
CW STAFF

DAYTON, Ohio — Year by year, NCR Corp. drifts farther behind IBM and the other makers of what NCR Chairman Charles E. Exley Jr. calls "monolithic mainframes" in the race to provide raw CPU power.

For about five years, NCR has forsaken the large-scale mainframe for smaller, more modular systems. It also shifted its emphasis from the more traditional batch orientation to emphasize on-line transaction processing (OLTP). In connection with that, NCR has revamped its processor product line during the past year by introducing a new primary host, the modular 9800 family, and by boosting the Unix-based Tower's performance more than threefold.

But large-scale processors and multiuser systems represent a relatively small portion — 34% — of NCR's business. The company that built its name on cash register sales before branching into computers draws 46% of its revenue from industry-specific workstations such as automated teller machines and point-of-sale terminals.

Those specialized workstations represent the largest part of NCR's business and what Exley says could be the most promising area for NCR growth. He says, for example, that 1986 saw strong growth in the financial terminals business.

But those workstations also are in a market in which NCR faces stiff competition from a variety of vendors, many of which are smaller and more narrowly focused. "The challenge is that while maintaining our advantage of being a broad product area company, we have to be as fast on our feet as a more narrowly focused company," Exley says.

NCR's special-purpose terminals, based on platforms using other vendors' technology and NCR products such as the Tower and NCR Personal Computer, include cash registers, ATMs, point-of-sale terminals, bank teller stations, information terminals and self-service gasoline station systems. Industry-standard platforms also are factors in the Tower family, which NCR markets to OEMs and large-user companies that do their own system integration.

GAMMA LIAISON PHOTOS

NCR Chairman Lynch

The Tower, based on Motorola, Inc. 68000 microprocessors, is a family that has grown to range from a 4-year-old, eight-user supermicrocomputer to a superminicomputer introduced in February with support for 128 connections.

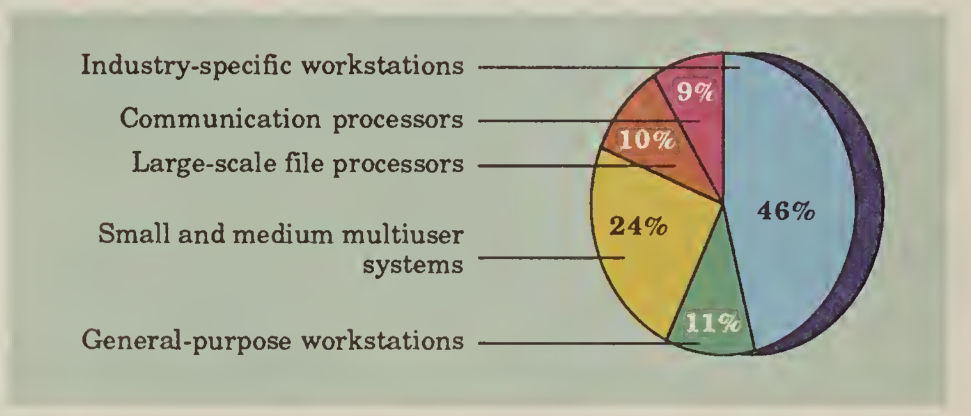
NCR Vice-President for General Purpose Systems Development and Production Hugh J. Lynch calls the Tower family "the most open system on the market." He claims it has more open interfaces than its competitors in the 68000-based Unix system marketplace and notes that NCR has helped to set standards. He says NCR and Shugart Corp. cooperated in developing the small computer systems interface, which has become a standard for tying peripherals to multiuser systems.

Exley says he sees the Tower as an office server or networked processor.

"The biggest growth opportunities really are in the departmental systems area. That is the biggest single unsold market," Exley says. But, Lynch adds, NCR's value-added resellers (VAR) are finding new markets for the Tower, for example in technical computing.

NCR product split

Percent of NCR revenue by product line



INFORMATION PROVIDED BY NCR CORP.
CW CHART: MITCHELL J. HAYES

Lynch says users can expect low- and high-end additions, such as the Tower 32/800, every 18 months.

One consultant reports that the Tower has driven NCR into a commanding position in the Unix market. "Surprisingly enough, NCR, I believe, is now the leading supplier of Unix engines in the world. They have about 20,000 units installed with about 12,000 shipped over the last year. I believe with that volume they are way ahead of anyone else in this game," says Omri Serlin, principal of Itom International Co., a Los Altos, Calif.-based consulting firm.

Serlin notes that the 68000-based Tower was poorly received by the OEM community four years ago. But NCR persisted by adding systems based on the Motorola 68010 and 68020 chips and found success in volume end-user sales to its customer base. Once those users bought it, OEM customers became more interested, Serlin adds.

Another analyst, Thomas Henkel of Boston's The Yankee Group market research firm, says the Tower also fits into NCR's plans as an applications

Continued on page 85

NCR marches

CONTINUED FROM PAGE 1

"We're really marching to our own drummer," says Charles E. Exley Jr., NCR's no-nonsense chairman and president, who enjoys his day's first cigar before 10 a.m. "I think that five years from today, we will be widely recognized as a top-quality organization. In the past, we've had the recognition we've deserved — good in some respects and not so good in others."

Exley and his management team have generally earned high marks for steering NCR smoothly through a treacherous time in the industry. But the company now faces an even bigger challenge: how to translate its new product strategies (see story above) into growth rates more typical of a high-tech boom company than a Midwestern manufacturer.

'High-growth flyer?'

"It's like there are two NCRs, the old and the new," says Donald Young, who follows the company for Sanford C. Bernstein & Co., a New York-based investment banking firm. "In the new product areas — the Tower, Unix, fault-tolerant systems, semiconductors and micros — the annual growth is around 26%. That's pretty exciting, but the old products — point-of-sale and teller terminals, document processors and the proprietary-architecture V series — are still the lion's share of NCR today. The big question is whether the new products are enough to turn NCR into a high-growth flyer."

That, clearly, is what NCR intends to do. Exley says NCR's 13% sales growth in 1986 — its first double-digit year since 1980 — was second only to Digital Equipment Corp.'s among the major computer vendors, and he would like to stay near the top of the heap.

By most observers' accounts, Exley has done a crackerjack job of overhauling and rejuvenating NCR since he was named chief executive officer four years ago. Between 1980 and 1982, NCR's previously strong profit growth stalled, and in 1981 earnings dropped 18%.

To make matters worse, NCR's flagship product lines of the late 1970s were beset by reported software bugs and resulting user lawsuits, including an industry-record $3.2 million awarded to Oakland, Calif., dry cleaning firm Glovatorium in a highly publicized 1982 case. Some users of 9000 series minicomputers are still experiencing system crashes, according to Norman Cohen, an Atlanta-based consultant to several plaintiffs in user suits.

Slow but steady

But with a renewed emphasis on fiscal controls and asset management, Exley has turned NCR into the large system industry's most consistent performer. While competitors both large and small have experienced steep profit declines or losses during the industry slump of the past two years, NCR has maintained its forward momentum, albeit at a modest pace. Among the six largest mainframe vendors, NCR's gross margins and return on equity are second only to IBM's.

NCR President Exley

"They may be the kind of company that does better when the environment is weak," says hardware industry analyst Steven Milunovich of First Boston Corp. "When everyone else was booming, they didn't have the double-digit growth, so they had less inventory pileup when demand dropped. And their primary markets, retail and financial, have been doing reasonably well."

"We aim to be one of the industry's fastest growing companies," Exley says. "But to do that, we're going to have to be good in all parts of our business; being good in one or two parts won't do it."

On the product side, NCR has charted its course on what it believes are or will be industry standards, such as Unix and the Motorola, Inc. 68000 series microprocessor. That puts pressure on NCR developers to turn out products, because a slew of competitors can use the same basic platforms in the race to market.

"We are going to need a new top and bottom of our product line every 18 to 24 months," says Hugh J. Lynch, NCR's vice-president of general-purpose systems development and production. "If you're open, you have to do that or you're going to die."

To meet the demands of both development and manufacturing, Exley insists on a highly decentralized management style. "I get carried away a little bit with my own conviction about delegating decision making," he says. "To me, decision making at the lowest possible suitable level will result in lower cost and higher quality. And that doesn't mean just vice-presidents and general managers; I'm talking about everybody, including assembly labor."

In manufacturing, most NCR plants use elements of the Japanese *kanban* system, in which production is more directly linked to demand, to keep its inventories among the lowest in the industry. "There is really a new zeal for manufacturing technology in the company today," Exley says.

Few observers dispute the fact that NCR is a well-run company. But NCR admits that the jury is still out on how well the 103-year-old firm can leverage management strength into the double-digit annual sales growth that eluded it during the computer industry boom of the early 1980s.

NCR is staking its prospects

Continued on page 86

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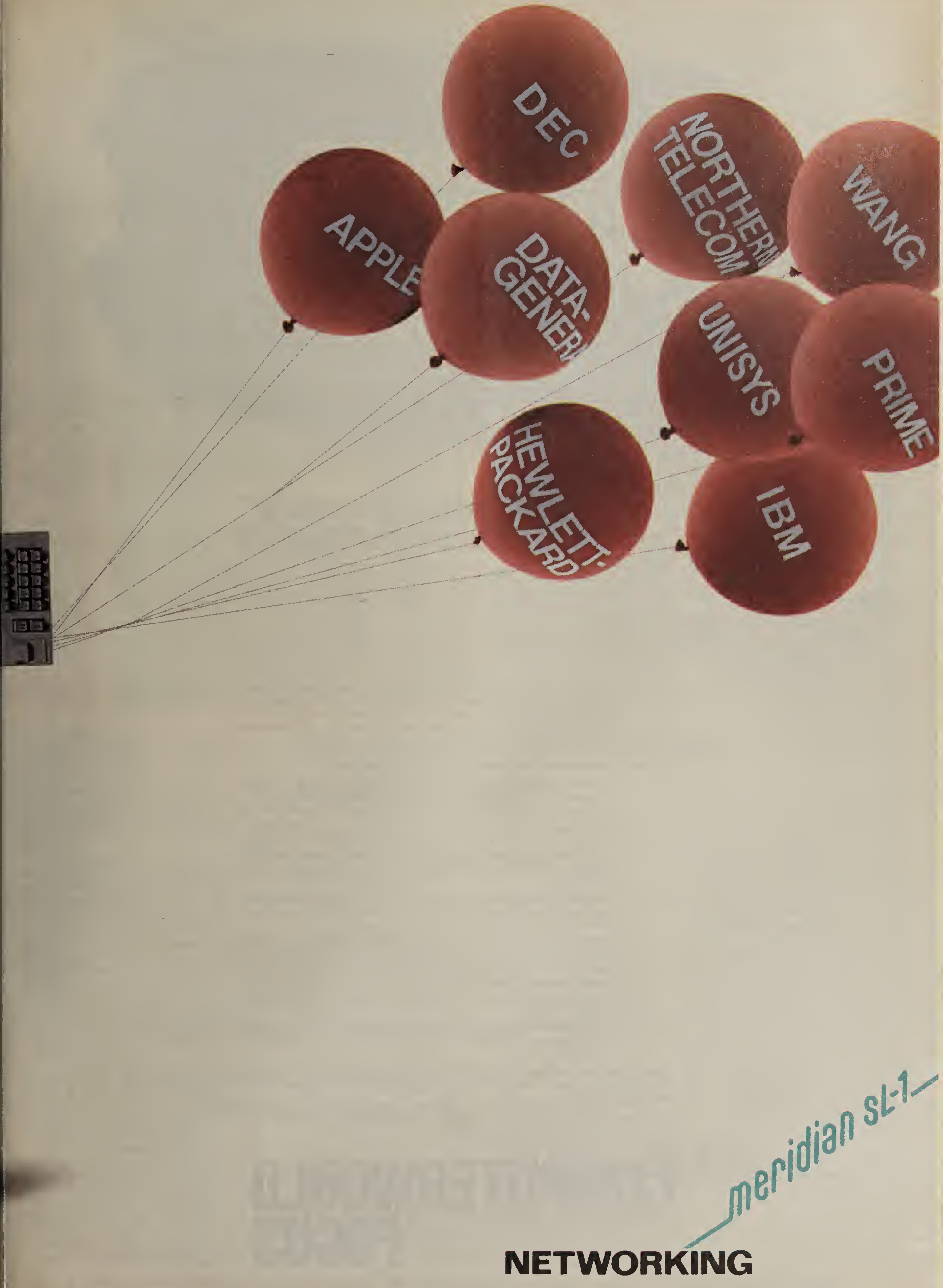
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NCR's move

CONTINUED FROM PAGE 81

development node tied to 9800s. He reports NCR is working on a 9800-based C compiler that could let Unix-based applications be moved to 9800 hosts.

The Tower's new performance range of 0.5 million to 8 million instructions per second (MIPS) pits it against competing vendors' systems such as the IBM 9370s and Digital Equipment Corp. VAXs and moves it into the range of NCR's own 9800 family. And, while the 9800 runs NCR's VRX-E operating system and the Tower runs Unix, comparisons between the Tower and the 9800 also can be drawn in how power is added.

Have a slice of power

NCR emphasizes its ability to add power in slices. The company introduced the concept in some models of its 8000-series mainframes but did not concentrate on the power slices approach until the 9800 debuted in April 1986.

Rather than keep all processing power in a single cabinet or in a few loosely coupled cabinets, NCR splits processing among multiple processors in up to 12 cabinets that can be stacked two-high, like building blocks. The cabinets contain application processors that handle instructions and I/O operations. They also contain data storage processors that are the data file controllers for system memory and disk storage.

NCR officials stress that the slice approach lets them offer common processors in configurations that can grow from a 9811, which has one application processor and one data storage processor, to a 9884 with eight application processors and four data storage processors.

Lynch notes that the architecture allows a customer to modify its configuration not only by installing more processors but by activating and deactivating application processors as needed throughout a work day. He cites the example of a bank that needs two application processors to support its ATM network for most of the day but may need six application processors at peak periods such as lunch hours.

NCR implemented a similar strategy on the Tower 32/800. In that architecture, segments of the Unix operating system are distributed to specific plug-in processors designed to handle application processing, file storage, terminals and printers, wide-area communications and local-area networks.

A fully configured Tower 32/800 provides three times the power of the previous high-end Tower 32/600. In CPU horsepower, an 8-MIPS rating drives the Tower past the 4 MIPS of the high-end 9884 and the largest members of the 11-year-old 8000 family.

But it is the 9800 family that NCR says it sees as a replacement for the current 8500 and 8600 models. The 9800 was designed to allow customers to migrate from 8000s, which run NCR's VRX operating system, to the 9800 and VRX/E.

The 9800 is being offered as a host machine and is the key element in NCR's OLTP strategy. Under that strategy, the 9800 is being offered as a transaction processor with general-purpose capabilities, allowing it to run as a stand-alone host or as a front-end for an IBM or other mainframe in a transaction-oriented network.

The positioning of the 9800 leaves it matched not only against IBM mainframes with transaction processing features but against a growing number of superminicomputers, including the fault-tolerant, OLTP-oriented offerings of Tandem Computers, Inc. and Stratus Computer, Inc.

Batch-processing asset

"One of the things that differentiates the 9800 from other transaction processors is that the 9800 has very good batch processing capabilities. You can't just do transaction processing and have that be the end of it," Lynch says. He claims the 9800 offers the advantage of being able to do batch-oriented tasks such as file maintenance without having to rely on a host.

But NCR still faces roadblocks as it expands its OLTP market presence.

"The hardware is there, but the software is noticeably lacking. NCR is still scratching around trying to find good, quality software developers to write for their products," Yankee Group's Henkel says. He maintains that NCR is six to eight months away from offering needed OLTP software, which provides IBM, Tandem and Stratus with headstarts. He notes that the delay leaves room for DEC to hurt NCR with an OLTP product expected by the end of this year.

However, Henkel notes, NCR — with a background in retail and financial applications — is in the right market to take advantage of the expected growth in the OLTP demand.

Itom's Serlin adds, "The 9800 was intended to create a momentum for NCR. That thrust has been going a lot slower than they would like. Basically, that is because a lot of the key hardware and software was slow in coming out and in some cases is still missing."

Lynch says NCR recognizes that the software was somewhat behind the hardware in the 9800 offerings.

He says NCR is moving its implementation of Cincom Systems, Inc.'s Mantis fourth-generation language product and NCR's Multi-Tran transaction processing software into 9800 control sites. Another key component in the software strategy is to build on the 9800's relational data base capabilities, which Lynch says are important, both in making the 9800 incremen-

Continued on page 86

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NCR marches

CONTINUED FROM PAGE 81

on the traditional "product sell" approach, maintaining that strong systems based on industry-standard platforms will sell into many different markets. Ironically, NCR's shift away from the vertical marketing approach came about because it found itself too focused on the retail and financial markets.

"The root of it was we got into a weak competitive position with our products," Exley says. "When you hear a company talking about solutions and verticals, it usually means its product prospects have gotten a bit weak."

In addition to direct sales, NCR's strategy is to leave it up to its value-added resellers to customize its products for specific niches. NCR has set a goal of $400 million in sales through indirect channels this year, up from just $50 million four years ago.

"We have done a mammoth amount of research into every vendor's value-added reseller program, and satisfaction among the value-added resellers is not necessarily high across the board," says Gilbert P. Williamson Jr., NCR's executive vice-president with primary responsibility for U.S. and international marketing.

Although NCR is committed to its value-added reseller partners, it seriously frowns upon a major corporate marriage on the scale of that of Burroughs Corp. and Sperry Corp. or IBM and Rolm Corp.

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Despite NCR's brief flirtation with Sperry last year (on which Exley declines to comment) when the latter searched for a "white knight" to fend off the Burroughs bid, Exley, a 22-year Burroughs veteran, is adamant on the subject of acquisitions.

"In my personal experience, they have been a waste of time and money," he says. "Our responsibility is creating value, and that says to me that we should build the business from within. Going out and buying companies is not the way to create wealth."

NCR is confident that its revamped product line, based on relatively open architectures and exciting new technologies, will translate into market success. As the company reaches the $5 billion revenue milestone this year, it still believes — in a reduced-demand era of niche marketing and vertical solutions — that superior products alone can make the firm a winner.

"In our industry, as a general statement, the thing that makes for a growing martketplace are exciting and innovative products," Exley says. "We can make our own boom if we do everything right."

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NCR's move

CONTINUED FROM PAGE 85

tal and capable of automatic mirroring.

Exley says he expects the 9800 to continue growing with power boosts every 18 months to two years until it eventually outpowers the 8000 family.

"We can have an exciting mainframe business, although I don't think the overall mainframe business is growing very fast," Exley says. He adds he does not see 9800s replacing IBM mainframes. "There is a tremendous inertia in replacing a host. I don't see a lot of cases where we are replacing IBM hosts or IBM systems are replacing our hosts," he says.

While NCR is promoting its VRX/E-based 9800s, the company has been enhancing a second large-systems line with its 9300, 9400 and 9500 processors running the firm's ITX operating system.

NCR officials differentiate the ITX and VRX/E families by noting that the VRX/E models tend to be sold into mainframe-oriented sites with high levels of MIS resources and support. They say the ITX models are easier to use and are aimed at companies with more limited DP staffs and hard-wired terminals.

NCR also draws about 11% of its revenue from general-purpose workstations, including terminals and an IBM-compatible personal computer line, which the company markets to its installed base and through retail outlets.

Another 9% of NCR's sales involves its Comten communications processors, which in large part are targeted as front-end processors in IBM data centers.

EMPLOYMENT TODAY

Professional groups, agencies help employees bounce back from layoffs

BY NANCY BLUMENSTALK MINGUS
SPECIAL TO CW

Economic upheavals in the last few years have caused financial institutions on the West Coast to merge, oil companies in the Southwest to close and industrial plants in the Northeast to shut down. As a result, more than two million employees nationwide have lost their jobs in the last five years. As market slumps and company mergers continue this year, more people will find themselves unexpectedly out of work.

Although the majority of these layoffs affect blue-collar workers, MIS professionals are not exempt. For example, one data processing manager had been at Crocker National Bank in Los Angeles for 25 years, yet he was laid off in the takeover by Wells Fargo Bank, NA in San Francisco. In another instance, nearly 20 DP professionals lost their jobs when Westinghouse Electric Corp. closed its Buffalo, N.Y., MIS shop.

Whether one is an MIS manager or a blue-collar worker, there are two important effects of a layoff. The obvious one is financial — people become concerned about making ends meet. However, the greater, less obvious impact is on a person's psyche. Newly unemployed people tend to forget that work is only one aspect of their lives, says Jackie Schwartz, a Los Angeles psychotherapist and management consultant.

Layoffs are particularly hard to deal with when poorly handled by management. Says one MIS administrator awaiting a July layoff, "I feel betrayed. The way it was done created hard feelings. The paper announced it before anyone told us."

The family's reaction also affects how a person handles a layoff. "It's a basic blow to self-esteem," Schwartz says. People need the immediate support base provided by the family. "Men, in particular, have problems with layoffs. They need support but don't know how to ask for it."

While many placement advisors believe job hunting should be conducted eight hours a day, starting with the first jobless day, this goal is unrealistic. A person needs time to adjust to a layoff.

During this adjustment time, Schwartz says, "family life, community and religious contributions give a sense of accomplishment, importance to a person." Balancing these activities while averaging 20 hours per week specifically on the job search is the most effective way to cope with a layoff, she suggests.

Preparatory steps

Although getting a new job is of prime importance, the unemployed should take a few preparatory steps before hitting the pavement.

"Start with a program to market yourself," advises Bob Palumbo of The Recruitment Group in Buffalo. "Find out who the potential hirers are, then develop an excellent resume and mail it to them. Contact the person who will make the hiring decision, not just personnel who may prematurely screen out applicants."

Some recruiting companies will help with a marketing campaign. In most large cities, Robert Half EDP Personnel Specialists, Inc., Romac & Associates Personnel Consultants and Source EDP Personnel Services, Inc. operate branch offices. These are just three examples of recruiters dedicated almost exclusively to MIS personnel. Keep in mind, however, that client companies pay these agencies. They will concentrate on placing the highest quality candidates. If your skills are more general or there is something lacking in your background, you may have to push harder to get interviews.

> "DON'T assume the interviewers are great at their jobs. Provide them with all relevant information, asked for or not. This will ensure a fair representation of skills."
>
> BOB PALUMBO
> THE RECRUITMENT GROUP

Another good way to locate potential employment is by joining professional organizations. Steve Adamson, president-elect of the Orange County, Calif., chapter of the Association for Systems Management (ASM), says, "Various chapters of ASM, the Data Processing Management Association and the Association for Computing Machinery do different things. Some publish positions, some have employment functions; but that is not as important as knowing 30 to 40 or 100 to 200 people."

Another national organization in most cities is Forty Plus. A group designed for the unemployed who are aged 40 or more, Forty Plus provides support, counseling and referral services to its members.

Instead of leaving employees on the street, a few companies help in the job search. One such firm is Westinghouse. "We set up a self-directed placement center," says John Perry of Westinghouse's Buffalo Medium AC Motor Division. "After the last layoffs, we gave a one-day seminar on resume writing and interview skills. We provide employees with phones at no cost, and we subscribe to 22 newspapers." The center also provides on-line access to the Buffalo Private Industry Council system, which matches transferable skills to a dictionary of occupational titles.

Other places to turn after a layoff include state government services. California offers the Employment Development Department, and New York operates the state Job Service, for example. However, these offices are not placement agencies and tend not to list DP jobs.

'Polish your skills'

Regardless of the avenue you use to find contacts, remember that the best written resume in the world will only land an interview, not the job. Preparing for that interview is essential. Palumbo explains, "Polish your interview skills. Have someone coach you on what to say and when. Don't assume the interviewers are great at their jobs. Provide them with all relevant information, asked for or not. This will ensure a fair representation of skills."

Not everyone will find another position in MIS. Some people look at a layoff as an opportunity to go back to school or change careers. As more jobs require some computer knowledge, many DP professionals find exciting careers in non-MIS fields. An MIS professional willing to take short-term salary cuts may find other careers more challenging and secure in the long run.

Other professionals decide to start their own companies. Local small-business associations provide advice on securing capital and preparing a business plan.

Whatever approach is taken, people are generally unemployed for three to five months. They strike out a lot. But a positive attitude and a large dose of persistence will eventually pay off.

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

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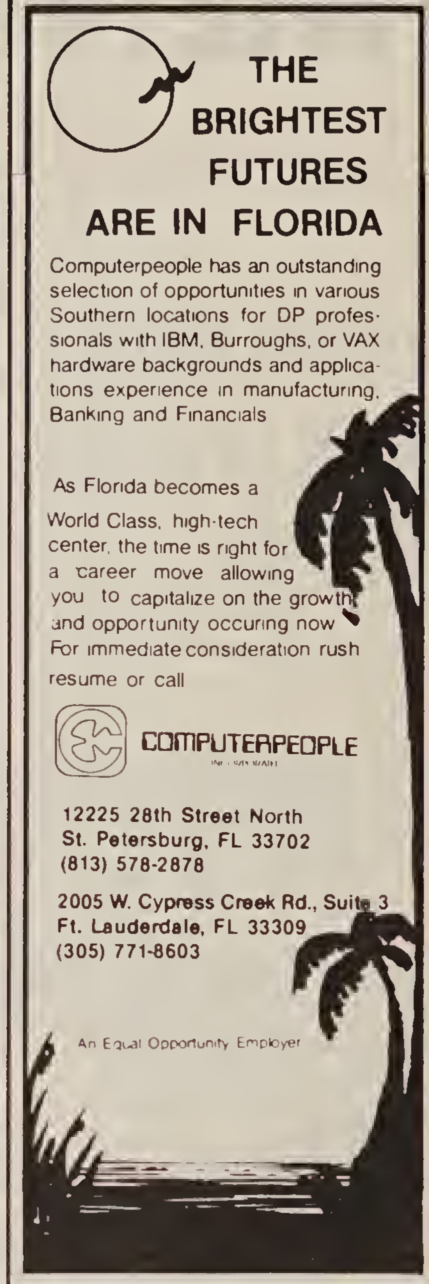

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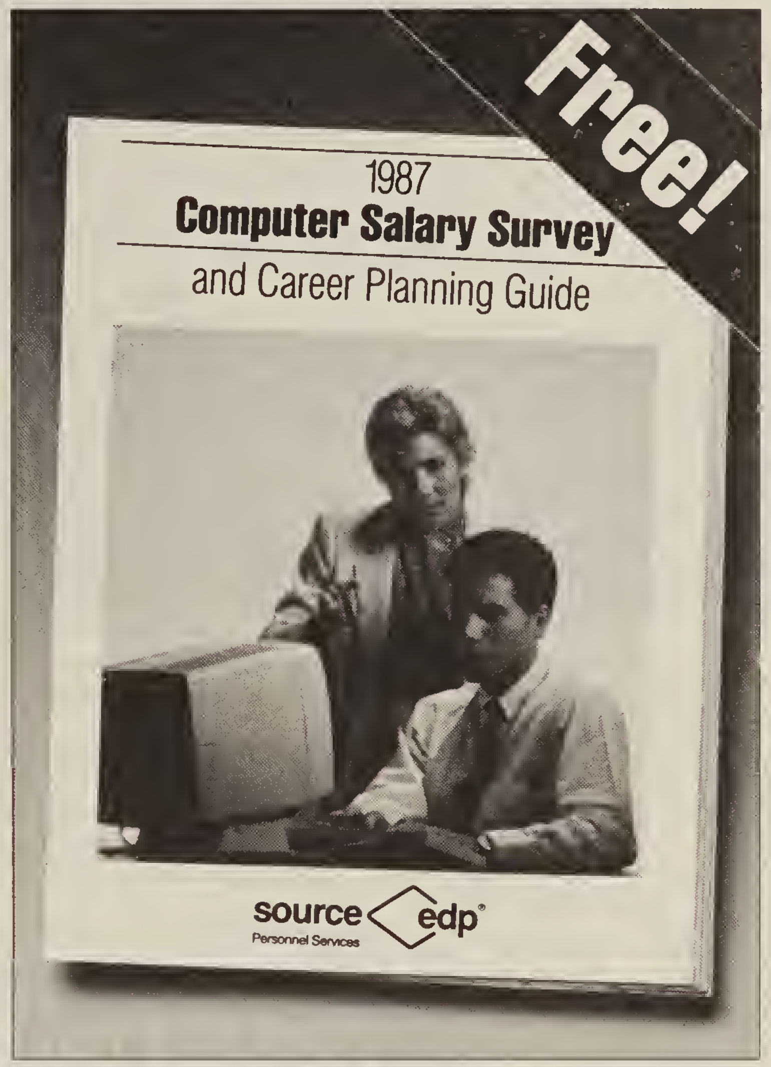

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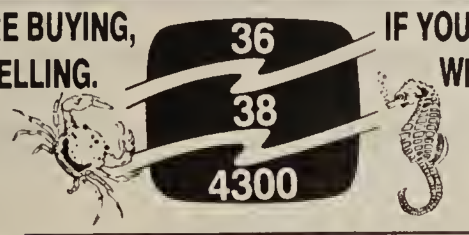

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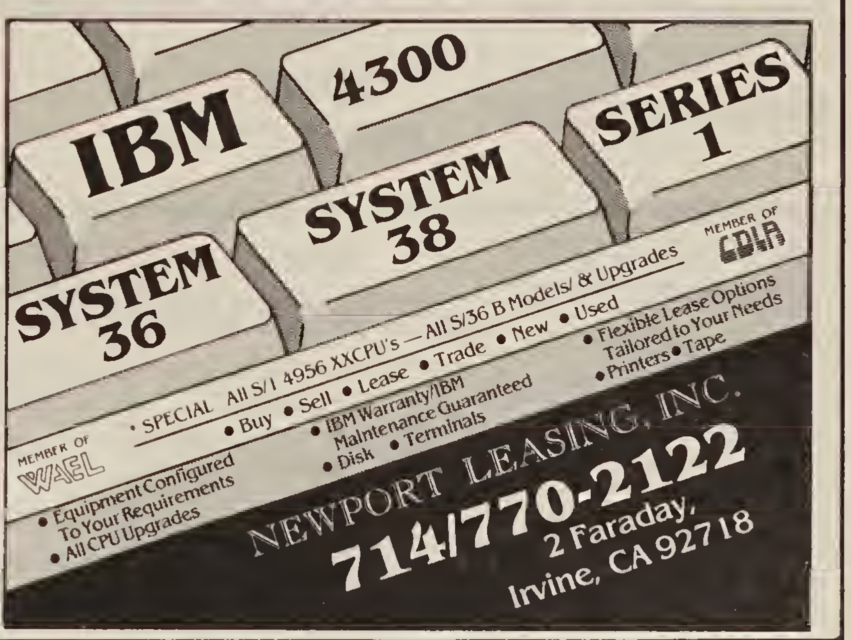

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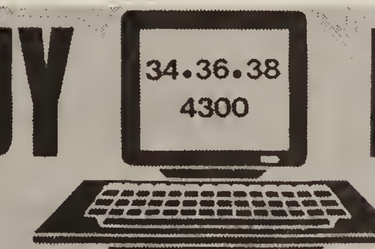

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Letters should be submitted to the attention of Ann R. Swantko, Chief Deputy, as soon as possible but no later than April 15th, 1987. 138 East Court Street, Cincinnati, Ohio 45202; (513) 632-8644

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
February 2, 1987 Volume XXI No. 5 [illegible]

COMPUTERWORLD

KS
KT
EE
KL
WS

NSIDE

Depth: Price Wa- rhouse expects ore from micro- mputers. 53

otlight: New tools o managers of IBM s networks get a er handle on plan- ing and problem vention. Pullout ition, follows e 52

IBM revs up 3090

Lack of advance notice riles users

BY JEAN S. BOZMAN
CW STAFF

A wave of anger rippled through the IBM user community last week as some of IBM's largest and most loyal customers criticized the vendor for failing to tell them in advance about its plans and for limiting field-engineering upgrades to its most powerful line of mainframes.

"The first things I learned about the new products were in the next day's *Wall Street Journal*," said one large Midwestern user who did not wish to be identified. "If IBM can't share information with me about what's coming, then they should be prepared to suffer the consequences."

That remark was echoed by other users, many of them Fortune 100 companies and each of which has invested millions of dollars in large IBM mainframes and associated operating systems software. Many of the users asked not to be identified because of their historically close relationships with IBM. Som these firms were among the first to install the IBM Models 200 and 400. learned that their mac would have to be upgrad higher E models in order t the new performance features.

'Frosted'

One MIS manager, who said he expects to upgrade his Model 400 to a Model 600E at a later date, described himself as irked and said, "One of the things that frosted me was that we have a Model 400 on-site, and the only way we can go is up. Going to a 400E would mean 10 million instructions per second. I could really use 10 more MIPS for a little more work over a weekend."

Another major user, whose company has already adopted a multivendor approach and has yet to acquire a 3090 model, said the upgrade strategy presents a fundamental problem to both MIS and IBM.

"Buying IBM is no longer the safe decision," according to the user, who requested anonymity. "This is going to diminish IBM's market position as other compa

Continued on page 6

chines, including its most powerful computer ever. But the announcement was clouded by concerns over limited and costly upgrade paths set for current 3090 users.

The 3090E series features performance improvements of up to 15% compared with the current 3090 line. It also features increased expanded storage and, in some cases, doubled main memory.

The company also announced enhancements to its VM operating system (see story page 9) and to the entry-level versions of its 3088 Multisystem Channel Communication Unit and 3800 laser printer. A 4248 line printer version was also unveiled.

Four of the six 3090E models are enhanced versions of existing models, while two — the 3090 Model 600E and Model 300E — are new machines. The Model 600E uses six central pr

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ts, and the three CPUs will be available er of this year. d the enhanced will be shipped in two

Continued on

IBM high end

Price/performance of 30

p charges foot-dragging on

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ADVERTISERS INDEX

Anderson .... PS 6
Applied Software 19
Artificial Intelligence 54
Astco 19

Bell Atlantic 62
BI Moyle 80
Brookvale Associates Inc. 28
Business Recovery Systems 28

CGI Systems 103
Chicago Soft 80
Cincom 26
Codex .... PS Cover 2
Computer Congenerics 52
Computer Associates 39
Computer Corp of America 5
CPT 38
CTS .... PS 7
Cullinet 16-17
CW Circulation 98
CW Corporate 78-79
CW Dial Inq .... PS 4
CW May Focus 84
CW Spotlight 60

Data General .... PS 8
Data Group .... PS 3
Data 21 10
Datagram 58
Dataware 72
D&B Computing 76-77
DCA Network 48-49
Digital Equipment Corp. 22-23
Duquesne Systems 15,45,50

Execucom 71

Federal Communications 8
Fibronics .... PS 5
Flaggstaff Engineering 56
Fujitsu 37

Gateway Microsystems .... PS 16
General Datacomm PS16

Hewlett-Packard 55,66-67

Infodata 40-41
Information Dimensions 32-33
Informix 30
Integral Systems 31
Interface 85
Interlink 12-13

Joseph & Cogan 86

Leasemetric 46

Microcom .... PS Cover 4
MicroFrame 18
MicroSoft 64-65
Mike Murach 9
Mitrol 25
MSA 104
Multi-Soft 14
Multi-Tech 47,PS 10

National Advanced Systems 61
Nixdorf 44
Northern Telecom 82-83
Nynex 43

Oracle 11

PCI Ads 36
Prime 28

Quality Micro Systems 56-57
Questronics 51

Racal Vadic .... PS Cover 3
Rapid Systems Development 73
Realia 68
Retrieval Technology 52

SAS Institute 34,53
Software Technology 10
Soft Pursuits 18,19
Softool 80
Software AG 24
Software Technology & Research (STAR) 30
Syncsort 3
Systems Solutions 51

Technology Transfer 69
Televideo 42
Teltone 63
Trak Software .... PS 6
Tymnet 74

Unisys 29
Universal Data Systems .... PS 9
US Robotics 27

VM Software 7

Xerox 72-73

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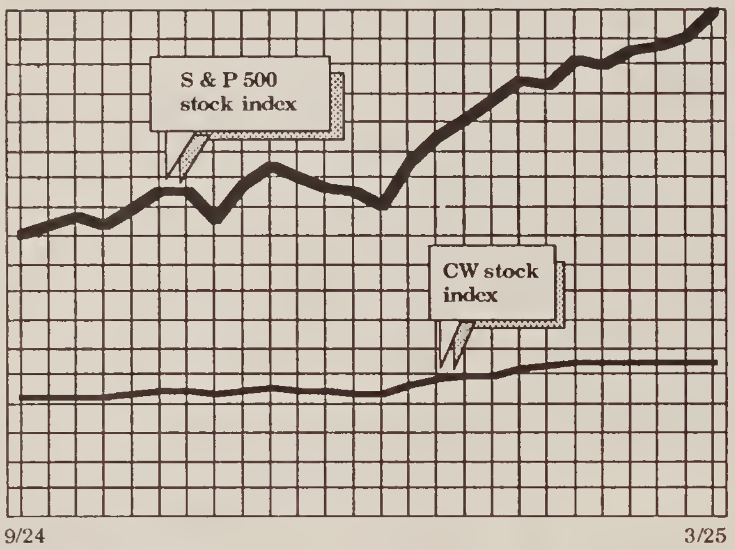
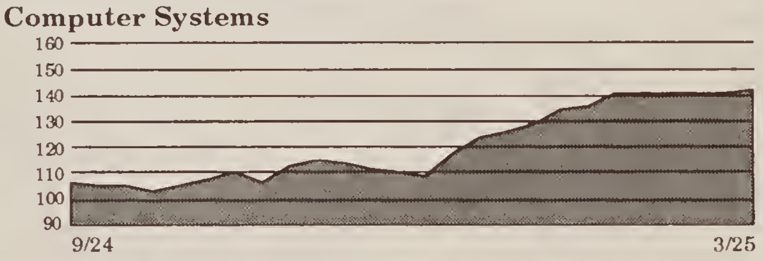
UPCOMING COMPUTERWORLD SPOTLIGHT SECTIONS

Issue Date	Topic	Ad Closing Date
April 27	T1 Equipment/Multiplexers	April 10
May 11	DEC-Compatible Software	April 24
May 25	PCs — IBM & Compatibles	May 8
June 8	LANs	May 22
June 22	Printers — Line & Character	June 5
June 29	Accounting Software	June 12
July 6	Manufacturing Technology	June 19

STOCK TRADING INDEX



Indexes	*Last Week*	*This Week*
Computer Systems	142.5	**144.1**
Supplies & Accessories	159.0	**157.4**
Software & DP Services	133.5	**131.9**
Semiconductors	111.2	**112.7**
Peripherals & Subsystems	133.8	**135.6**
Leasing Companies	117.4	**116.8**
Composite Index	117.3	**117.3**
S&P 500 Index	175.1	**179.6**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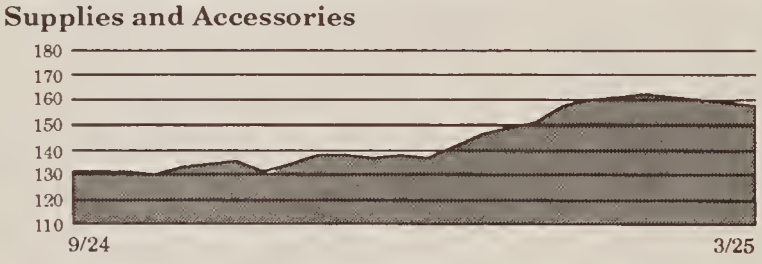
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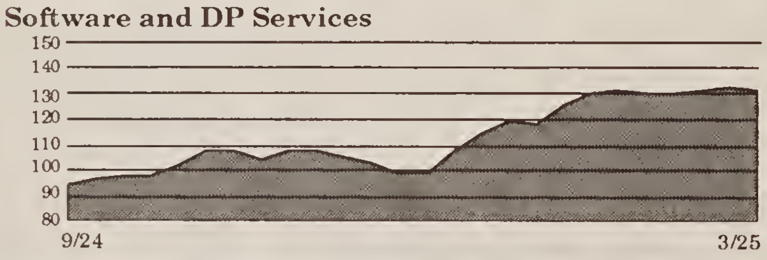
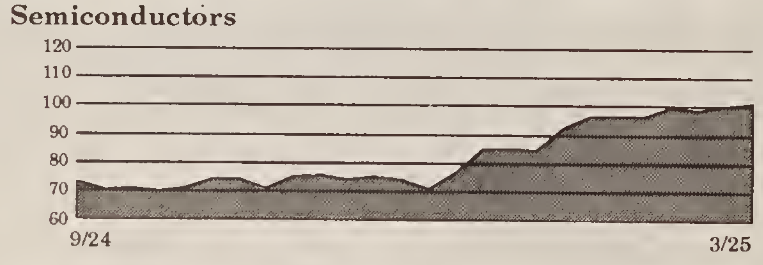
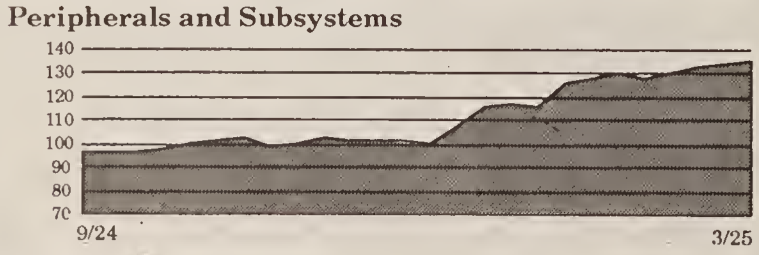
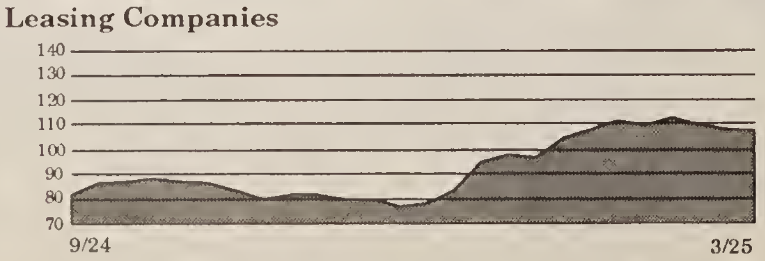

Software and DP Services


Semiconductors


Peripherals and Subsystems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Stock trading summary

CLOSING PRICES WEDNESDAY, MARCH 25, 1987

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.44	-0.2	-4.0
O	ALTOS COMPUTER SYS	19	10	14.63	-0.5	-3.3
A	AMOAHL CORP	41	14	38.25	+0.5	+1.3
O	APOLLO COMPUTER INC	23	9	19.25	+1.1	+6.2
O	APPLE COMPUTER INC	71	26	66.75	+0.8	+1.1
N	AT&T	28	22	24.88	+1.5	+6.4
O	C P T CORP	6	3	4.38	-0.1	-2.8
N	COMPAQ COMPUTER CORP	35	12	27.88	-0.4	-1.3
A	COMPUTER CONSOLES INC	12	7	8.50	-0.3	-2.9
O	CONCURRENT COMP CORP	19	11	15.75	+0.0	+0.0
N	CONTROL DATA CORP	31	20	30.75	+1.0	+3.4
O	CONVERGENT TECH	12	4	10.50	+0.5	+5.0
N	CRAY RESH INC	133	66	126.00	+3.4	+2.8
O	DAISY SYS CORP	15	8	10.00	-0.4	-3.6
N	DATA GEN CORP	45	25	31.88	-3.4	-9.6
N	DATAPOINT CORP	9	4	5.50	+0.0	+0.0
N	DIGITAL EQUIP CORP	173	76	165.50	+0.3	+0.2
N	FLOATING POINT SYS INC	46	11	13.75	-0.4	-2.7
N	GOULD INC	28	15	18.13	+0.5	+2.8
N	HARRIS CORP	40	27	37.88	+0.9	+2.4
N	HEWLETT PACKARO CO	63	36	58.63	+0.3	+0.4
N	HONEYWELL INC	B4	58	74.00	+2.9	+4.0
N	IBM	162	116	155.63	+9.4	+6.4
O	IPL SYS INC	4	2	3.13	-0.1	-3.8
N	ITT CORP	66	43	63.38	-0.1	-0.2
N	M A COM INC	19	12	14.13	-0.1	-0.9
N	MATSUSHITA ELEC INOL LTD	136	74	109.75	-10.0	-8.4
O	MENTOR GRAPHICS CORP	29	11	27.00	+0.0	+0.0
N	NBI INC	14	8	10.3B	-0.1	-1.2
N	NCR CORP	70	40	68.13	+5.3	+8.3
N	PRIME COMPUTER INC	24	16	21.63	+0.5	+2.4
O	STRATUS COMPUTER	37	18	34.00	+0.0	+0.0
O	SYMBOLICS INC	15	4	5.38	+1.1	+26.5
O	TANOEM COMPUTERS INC	75	22	72.88	+2.4	+3.4
N	TANOY CORP	56	31	50.50	-0.1	-0.2
N	TEXAS INSTRS INC	189	103	187.75	+18.0	+10.6
A	ULTIMATE CORP	35	13	23.50	-0.9	-3.6
N	UNISYS CORP	113	5B	103.00	-2.1	-2.0
A	WANG LA8S INC - 8	20	11	16.13	+0.3	+1.6
A	WANG LA8S INC - C	20	11	15.50	-0.6	-3.9
N	XEROX CORP	77	49	76.38	+3.3	+4.4

Supplies & Accessories

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	29.25	+0.5	+1.7
N	8ARRY WRIGHT CORP	24	14	17.38	+0.1	+0.7
A	DUPLEX PRODS INC	23	18	21.25	-0.8	-3.4
N	ENNIS 8USINESS FORMS INC	23	14	22.25	-9.8	-30.5
N	3M CO	140	97	131.75	+6.0	+4.8
N	MOORE LTD	28	20	26.13	+2.1	+8.9
O	STANDARD REGISTER CO	53	32	47.50	+0.5	+1.1
N	WALLACE COMPUTER SVCS	50	37	48.75	+3.9	+8.6

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCED COMP TECH	7	3	3.75	-0.3	-6.3
N	AOVANCED SYS INC	22	12	21.13	+0.1	+0.6
N	AGS COMPUTERS INC	40	17	37.00	-0.3	-0.7
O	AMERICAN MGMT SYS INC	33	13	31.00	+0.3	+0.8
O	AMERICAN SOFTWARE INC	30	10	29.13	+3.1	+12.0
N	ANACOMP INC	8	3	8.00	+0.6	+8.5
O	ANALYSTS INTL CORP	11	4	10.00	-0.3	-2.4
O	ASHTON TATE	30	10	23.63	-0.6	-2.6
O	ASK COMPUTER SYS INC	17	9	14.75	-0.9	-5.6
O	ASTRADYNE COMP IND	3	1	1.72	+0.0	-1.8
N	AUTOMATIC DATA PROC	50	29	49.00	+3.3	+7.1
O	BOOLE & 8A88AGE INC	11	4	9.00	-0.5	-5.3
N	COMPUTER ASSOC INTL INC	47	17	45.13	+5.4	+13.5
O	COMPUTER HORIZONS CORP	15	10	13.50	-0.3	-1.8
O	COMPUTER NETWORK TECH	10	4	4.69	-0.4	-7.4
N	COMPUTER SCIENCES CORP	61	30	59.00	+6.5	+12.4
N	COMPUTER TASK GROUP INC	19	11	14.25	-0.1	-0.9
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	18	10	16.00	-1.8	-9.9
N	CULLINET SOFTWARE INC	16	6	10.00	-0.1	-1.2
O	CYCARE SYS INC	17	7	9.13	+0.3	+2.8
O	DUQUESNE SYS INC	30	12	28.75	+2.5	+9.5
N	GENERAL ELEC CO	111	71	110.13	+3.1	+2.9
N	GENERAL MTRS CORP (CLASS E)	50	24	35.50	-2.4	-6.3
O	HOGAN SYS INC	17	7	15.75	-0.6	-3.8
O	INFORMATION SCIENCES INC	4	1	1.13	-0.4	-25.0
O	INFOTRON SYS CORP	17	7	8.50	-0.8	-8.1
O	KEANE INC	16	5	8.13	+0.1	+1.6
N	LOGICON INC	38	22	29.25	+1.0	+3.5
O	LOTUS OEV CORP	25	8	21.00	-0.5	-2.3
O	MANAGEMENT SCI AMER	21	11	18.25	-0.4	-2.0
O	MCI COMM CORP	12	5	6.50	-0.3	-3.7
O	MICOM SYS INC	18	10	16.13	+0.3	+1.6
O	MICRO PRO INTL CORP	6	2	5.19	-0.1	-2.4
N	MICROSOFT CORP	92	26	89.8B	+0.4	+0.4
O	NATIONAL DATA CORP	27	16	25.75	+0.1	+0.5
O	ON LINE SOFTWARE INT	24	10	22.75	+0.3	+1.1
O	ORACLE SYS CORP	22	7	20.50	-19.8	-49.1
N	PANSOPHIC SYS INC	42	25	37.00	+2.8	+8.0
O	POLICY MGMT SYS CORP	30	15	26.75	+0.3	+0.9
O	PROGRAMMING & SYS INC	13	8	11.00	-0.5	-4.3
O	REYNOLDS & REYNOLDS CO	42	27	39.00	+0.3	+0.6
O	SCIENTIFIC COMPUTERS INC	8	4	7.50	-0.4	-4.8
O	SEI CORP	26	15	25.50	+0.3	+1.0
O	SHARED MED SYS CORP	53	30	35.50	-0.4	-1.0
O	SOFTWARE AG SYSTEMS INC	22	10	11.00	-0.9	-7.4
O	SOFTWARE PUBG CORP	16	5	14.00	-0.1	-0.9
A	STERLING SOFTWARE INC	21	10	12.75	+0.3	+2.0
N	SUNGUARO OATA SYSTEMS	20	10	18.00	-0.3	-1.4
N	UCCEL CORP	36	18	33.88	+1.4	+4.2
N	URS CORP	22	14	20.38	-0.1	-0.6
O	VM SOFTWARE INC	44	12	42.75	+3.8	+9.6

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCEO MICRO DEV	32	13	19.75	-1.1	-5.4
N	ANALOG OEVICES INC	25	14	20.25	+0.6	+3.2
O	ANALOGIC CORP	14	10	11.88	+0.0	+0.0
N	APPLIEO MAGNETICS CORP	31	13	30.25	+1.9	+6.6
O	AVANTEK INC	23	14	16.88	-0.3	-1.5
O	HADCO CORP	7	3	6.13	+0.6	+11.4
O	INTEL CORP	41	16	38.25	+0.0	+0.0
O	MICRO MASK INC	7	2	5.75	-0.1	-2.1
N	MOTOROLA INC	58	34	55.25	+0.9	+1.6
N	NATIONAL SEMICONDUCTOR	17	8	15.88	-0.3	-1.6
N	TERAOYNE INC	30	16	24.75	+0.8	+3.1

EXCH: N = NEW YORK; A = AMERICAN; P = PACIFIC; 8 = BOSTON;
L = NATIONAL; M = MIDWEST; O = OVER-THE-COUNTER; S = SPLIT

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Peripherals & Subsystems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	8.88	+0.3	+2.9
A	ANOERSON JACOBSON INC	4	1	2.63	-0.4	-12.5
O	AST RESH INC	23	11	17.50	-2.3	-11.4
O	AUTOTROL CORP	10	5	7.75	-0.6	-7.5
O	AVANT GAROE COMPUTING	7	3	3.88	-0.3	-6.1
O	BANCTEC INC	13	6	11.75	+0.4	+3.3
N	BOLT BERANEK & NEWMAN	60	37	55.13	+1.3	+2.3
A	CETEC CORP	9	5	5.63	+0.3	+4.7
A	COGNITRONICS CORP	6	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	26	16	21.63	-0.4	-1.7
N	COMPUTERVISION CORP	23	10	18.38	-1.8	-8.7
N	CONRAC CORP	29	12	28.75	+6.8	+30.7
A	OATAPROOUCTS CORP	18	11	13.88	+0.5	+3.7
A	OATARAM CORP	18	7	8.25	-0.4	-4.3
O	OATA SWITCH CORP	9	5	6.38	+0.1	+2.0
O	OATUM INC	7	4	6.13	+0.4	+6.5
N	DECISION INOS CORP	15	8	9.00	-0.9	-8.9
O	ENDATA INC	9	5	8.75	+0.1	+1.4
O	EMC CORP	34	11	25.38	-0.1	-0.5
O	EVANS & SUTHERLAND	40	20	36.75	-1.8	-4.5
N	FLOATING POINT SYS INC	46	11	13.75	-0.4	-2.7
O	GANDALF TECHNOLOGIES	11	5	10.63	+2.0	+23.2
N	GENERAL OATACOMM IND	15	8	13.50	+1.4	+11.3
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	12.38	+0.1	+1.0
O	INFORMATION INTL INC	18	13	14.25	-1.5	-9.5
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	13.63	-0.5	-3.5
O	MEGADATA CORP	7	2	5.38	-0.4	-6.5
A	MSI DATA CORP	17	10	15.75	-0.4	-2.3
N	NASHUA CORP	30	20	29.75	+1.9	+6.7
O	NETWORK SYS CORP	19	11	16.75	+0.9	+5.5
N	NORTH AMERN PHILIPS CORP	48	35	40.75	+0.8	+1.9
N	NORTHERN TELECOM LTD	45	27	43.38	-0.6	-1.4
O	NOVELL INC	45	15	41.25	+1.5	+3.8
N	PARAOYNE CORP	11	4	6.50	-0.5	-7.1
A	PENRIL CORP	8	4	5.25	+0.1	+2.4
N	PLESSEY PLC	41	24	40.75	+2.1	+5.5
O	PRINTRONIX INC	15	10	11.50	+0.4	+3.4
N	QMS INC	18	11	16.00	-0.3	-1.5
O	RAMTEK CORP	7	3	4.75	+0.0	+0.0
N	RECOGNITION EQUIP INC	27	10	21.00	-0.8	-3.4
O	SCAN TRON CORP	19	11	13.38	+0.6	+4.9
N	SCIENTIFIC ATLANTA INC	18	9	16.75	+0.0	+0.0
O	SEAGATE TECHNOLOGY	42	9	36.13	+1.4	+4.0
N	STORAGE TECHNOLOGY	5	2	4.25	+0.0	+0.0
O	SUN MICROSYSTEM INC	33	11	32.00	+1.5	+4.9
A	T-8AR INC	B	5	7.88	+0.0	+0.0
A	TA8 PRODS CO	20	12	18.88	+0.8	+4.1
O	TANDON CORP	B	2	5.88	+1.9	+46.9
A	TEC INC	7	3	2.88	-0.4	-11.5
N	TEKTRONIX INC	43	27	39.75	+1.5	+3.9
O	TELEVIOEO SYS INC	4	2	3.00	+0.3	+9.1
N	TELEX CORP	102	52	92.75	+5.9	+6.8
N	TIMEPLEX INC	41	14	37.25	-2.5	-6.3
N	TITAN CORP	12	6	7.38	+0.0	+0.0
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	30	13	23.88	-1.3	-5.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	29	15	27.88	+1.3	+4.7
N	CONTINENTAL INFO SYS	14	7	13.63	+0.4	+2.8
O	FINALCO GROUP INC	5	2	2.88	+0.0	+0.0
O	PHOENIX AMERN INC	8	3	5.63	-0.1	-2.2
O	SELECTERM INC	12	5	4.75	-0.5	-9.5
N	U.S. LEASING	52	38	51.00	+0.5	+1.0

Boom pervades

Overall high buoys industry; IBM takes lead; TI bounces back

Stocks in virtually all computer industry sectors are sharing in the current market boom, which saw the Dow Jones industrial average rise to record highs in three of the first four trading sessions last week.

IBM, to no one's surprise, is leading the charge. Although Big Blue tailed off a bit on Thursday, the stock still racked up a 5⅜-point gain in four days to close at 154. The stock is reportedly back in fashion among large institutional investors, who hold approximately half of IBM's shares.

Texas Instruments, Inc., bouncing back nicely from its steep losses, is also riding the market crest. TI reached a 52-week high of 187¾ in Wednesday's session before falling 1⅞ points Thursday. Other New York Stock Exchange technology issues reaching new highs during the week were Comdisco, Inc., NCR Corp., Control Data Corp., Perkin-Elmer Corp., Xerox Corp., Anacomp, Inc., Automatic Data Processing, Inc. and Computer Sciences Corp.

Two computer stocks may have reached their peak, however. Unisys Corp. fell five points last week to 102½, and Digital Equipment Corp. dropped four points to 162½.

CLINTON WILDER

IBM readies

FROM PAGE 1

take best advantage of the new computer family's capabilities, according to several developers that have received invitations.

IBM will unwrap at least four aggressively priced systems, which some sources refer to as the Personal System 2 series. Specifics of the new machines were circulated last week by Winston & Winston, Inc., a Fort Worth, Texas-based public relations firm, and confirmed by other sources.

The series includes three 10 MHz Intel Corp. 80286-based machines, which have proprietary buses to increase speed and performance, and a 7.54 MHz 8086-based system designed to slow the momentum of low-end clone makers.

IBM has an 80386-based machine ready to debut, but the system may not be part of this week's announcements. The company may delay the system's introduction if it cannot effectively price and position it in relation to the 80286-based systems, one source said. Other sources remain split on whether the much-rumored 80386 system will appear.

Token-Ring enhancements

The company will also significantly enhance its Token-Ring network and PC Network systems to run up to four times faster than they do today. The products will include high-speed adapters, a Starlan version of the PC Network and an enhanced version of IBM's network operating system, according to published reports.

A 16M bit/sec. Token-Ring could be used as a backbone to connect multiple 4M bit/sec. rings with minimal problem to the customer, a source said.

The 80286-based systems, called the Models 50 and 60, respectively, will have 3½-in. floppy disk drives supporting 1.4M bytes.

All three systems will have serial and parallel ports and graphics adapters built onto the motherboard, sources said.

The Model 50 has 20M-byte hard disks and supports 640- by 480-pixel color graphics. The system's footprint is smaller than an existing PC AT, sources said.

The Model 60 is a floor-mount version of the 80286 systems that will be used as a file server. It will have choices of a 40M-byte or 77M-byte hard disk.

The Model 30 is the company's 8086-based system that is clearly aimed at clone makers. Despite its 8-bit processor, sources say the Model 30 is as fast as a PC AT in terms of throughput, thanks to accelerated graphics and disk controller.

The Model 30 is expected to be the only one of the new machines to incorporate an industry standard bus, allowing it to accept existing expansion cards.

Like the 80286-based systems, the Model 30 has serial and parallel ports on the motherboard and supports 640 by 320 pixels in color and 640 by 480 pixels in monochrome in a very small package.

Protected mode possible?

Several sources said they expect IBM to announce a protected-mode operating system this week but do not expect it to be delivered until much later this year.

Most expect the system to contain some proprietary extensions such as the user interface, which some expect to be an incompatible variation of Microsoft Corp.'s Windows.

Sources said they also expect IBM to unveil a relational data base management system featuring the Structured Query Language, a series of high-resolution monitors, a laser printer, various desktop publishing products, a compact disk/read-only memory drive, an expanded-memory adapter card and an endorsement of Aldus, Inc.'s Pagemaker.

IBM aims to lock up PC market

BY DOUGLAS BARNEY
CW STAFF

ANALYSIS

NEW YORK — IBM intends to regain control of the fragmented personal computer market with a rash of major PC, connectivity and software announcements this week that are intended to make life difficult for IBM's competitors.

High on the list of new products is a line of PCs with a proprietary bus, a new operating system based on Microsoft Corp.'s unreleased, protected-mode DOS with extensions developed by IBM and a higher performance implementation of the Token-Ring network. Layers of proprietary code are expected to make the machines very difficult to copy.

Taken together, the announcements indicate that IBM is attempting to convince MIS and data processing organizations to lock into IBM's personal computing and networking offerings.

MIS/DP and microcomputer managers will first have to decide whether to commit to a new 3½-in. floppy disk drive format, even though it may be better. Further, they need to determine whether a better bus is worth sacrificing compatibility with existing boards.

Strong signals

The announcements, which are largely strategic, will send out other strong signals to IBM's user base and competitors. According to the IBM strategy, the Intel Corp. 80286 chip is still a viable and growing architecture and will not be fully eclipsed by the 80386 chip in the near or immediate future.

But perhaps most important, the industry had better brace for a split in the market between the IBM camp and the myriad IBM Personal Computer compatible makers, which are sure to have difficulty cloning the next generation of IBM personal computers.

By splitting the market with semiproprietary PCs, IBM is forcing users to make some very tough choices. Users must decide whether to move away from the current industry standard and go to a new, enhanced IBM standard. Observers are divided on whether the computer giant can successfully change a standard that it no longer controls.

Good news, bad news

IBM reportedly is making changes to the standard for the sake of making cloning difficult and to add functionality in the form of higher capacity and more durable 3½-in. floppy disk drives, a higher performance bus and enhanced graphics.

IBM's expected networking announcements this week will be good news and bad news for Big Blue customers. On the positive side, the vendor's networking products should be getting long-overdue boosts in transmission rates. On the other hand, users may end up even more confused about which of IBM's networking products represent the main current of the company's marketing strategy.

According to one source, an announcement of the long-awaited 16M bit/sec. version of the Token-Ring next week is virtually certain. This raises the question of how easy — and desirable — it will be for 4M bit/sec. Token-Ring customers to upgrade.

Token-Ring as backbone

The source was told that upward migration requires a trade-in of interface boards and that IBM will provide a bridge between the two types of networks. This would mean that a 16M bit/sec. Token-Ring could be used as a backbone to connect multiple 4M bit/sec. rings, with minimal problems to the customer, he said.

However, there really is no need to connect personal computers over such a high-speed network. Observers speculate that the 16M bit/sec. Token-Ring will be oriented more toward the high end, with the first interface boards plugging into IBM's 9370 and 80386-based workstation.

Industry watchers are also puzzled by reports that IBM will introduce a version of Ethernet/Starlan, a 1M bit/sec., twisted-pair network that is a major element of AT&T's networking strategy. If IBM does make that announcement, it will probably target a particular niche rather than IBM customers at large, analysts speculate.

CW Senior Editors Ed Scannell and Elisabeth Horwitt and staff writer David Bright contributed to this report.

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Diskless 3Com unit unveiled

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. is expected to introduce 3Station today, the first in a line of diskless workstations featuring built-in network adapters and advanced graphics.

3Station is an IBM-compatible Ethernet "netstation." It is based on Intel Corp.'s 80286 processor and uses five custom ASIC chips and a read-only memory-resident menu-driven setup. A token-ring version is slated for delivery sometime during first-quarter 1988.

3Com is adapting more than 20,000 personal computers a month for use in networked work groups, said Chairman Robert Metcalfe, who also headed the 3Station product development team. "It's clear the time has come for us to provide our customers with workstations designed especially for networks," he said.

Priced at $1,895, the 3Station integrates the 80286 chip, Phoenix Technologies Ltd.'s BIOS version and four graphics adapters — a monochrome adapter, a Hercules Computer Technology, Inc. compatible and IBM Color Graphics Adapter and Enhanced Graphics Adapter compatibles. The workstation also includes 1M byte of main memory upgradable to 4M bytes, Lotus/Intel/Microsoft Expanded Memory Specification support and Ethernet. There are no expansion slots, no fan, no jumpers and no switches.

Memory rises

3Com stressed that the unit offers 25% to 30% more memory — 570K bytes of working memory is available for DOS and applications — than adapted personal computers, resulting in higher performance.

3Station's CPU has direct access to on-board graphics and network hardware. Memory mapping takes advantage of the available memory area normally dedicated to slots in traditional DOS machines, using this area as random-access memory to hold the company's 3+ networking software.

Analysts, vendors and dealers who have seen the product praised 3Station's sophistication and compact design.

"In terms of compactness, ease of installation, technology sophistication and price, 3Com has a winner," said Ralph Gilman, a senior vice-president with Infocorp, a Cupertino, Calif.-based research firm.

MIPS offers second RISC line

BY JAMES CONNOLLY
CW STAFF

SUNNYVALE, Calif. — MIPS Computer Systems, Inc. introduced the second generation of its reduced instruction set computing (RISC) line last week with the announcement of a Unix-based system designed to be configured as a computer server, disk server, file server or multiuser system.

MIPS claimed the M/800 processes 8 million instructions per second.

"MIPS is a technology company supplying RISC building blocks at three key levels of integration: component kits, boards and full systems. With the M/800, we have demonstrated that the company can deliver higher performance in an aggressive time frame," said Al Sisto, MIPS vice-president of sales and marketing.

The M/500 can be converted to the M/800 with an $11,500 CPU board.

The standard configuration for the M/800 includes 8M bytes of memory with error-correcting code, a 12-slot VMEbus card cage, a 337M-byte disk drive and a 60M-byte tape drive. The M/800 is priced at $51,330 in quantities of 10. It will be available in July, according to MIPS.

Chip tariffs proposed in retaliation

Cabinet seeks revenge against Japan's alleged unfair trade practices

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — President Ronald Reagan's Cabinet advisers, seeking to retaliate against Japanese semiconductor makers for allegedly unfair trade practices, last week urged the president to impose high tariffs on a variety of Japanese products using chips, perhaps including personal computers, disk drives and laser printers.

The president was expected to make his decision late Friday or early this week on the recommendation by the Cabinet-level Economic Policy Council.

Industry sources said the tariffs — which raise the price of Japanese imports — would be placed on products produced by the same Japanese firms accused of predatory pricing of their semiconductors. Those firms include NEC Corp., Hitachi Ltd., Fujitsu Ltd., Oki Electric Industry Co. and Toshiba Corp.

"It's likely to involve end-product items that are carefully defined so that they target particular companies," said Jon Kent, an American Electronics Association spokesman.

Placing tariffs on the finished products, rather than on Japanese chips themselves, protects U.S. manufacturers that use Japanese chips from the higher prices.

But U.S. officials said they believe the action will send a strong signal that the U.S. has lost patience with Japan's alleged violations of the July 1986 U.S.-Japan semiconductor trade agreement.

Honeywell

FROM PAGE 1

are glad it finally happened. We weren't looking forward to having to change vendors and are happy that we don't have to," said Mike Finley, director of MIS for Grand Prairie, Texas-based amusement park operator Six Flags Corp. Finley said Honeywell and Bull officials have kept him posted about restructuring developments.

Of the $527 million in cash, only $177 million reflects the value of the assets being sold to Honeywell Bull by Honeywell. The remaining $350 million is composed of Honeywell Bull's return to Honeywell of paid-in capital, or Honeywell's original investment in Honeywell's Information Systems division, and the repayment of the Information Systems division's debt carried on Honeywell's balance sheet. Honeywell said it will use most of the cash to reduce long-term debt incurred through the $1.4 billion purchase of Sperry Corp.'s Aerospace Group in December 1986.

Stern described the venture as a unique combination in the industry that reinforces long-term relationships among the companies. "Three independent companies, each strong national competitors in their home markets, are pooling their resources to develop a powerful worldwide force rooted in the U.S., Europe and Japan," he said.

Meyer, who joined Honeywell after completing two years as president of Varian Associates, Inc. in 1986 and who previously managed Sperry Univac's commercial minicomputer operations, said total research and development expenditures by both Honeywell Bull and the French Bull will total $500 million this year. He added that the combined R&D of the three owners totaled more than $3 billion in 1986.

Noting that the three owner companies have worked together in various ventures since 1972, Meyer said that with the new relationship, "We will be able to move more quickly and effectively to help meet the needs of customers."

Honeywell began working with NEC in 1962, when it signed an agreement to provide the Japanese firm with technology and products and, in effect, spawned what has become one of the largest computer businesses not only in Japan but in the world, which in recent years has provided mainframes at the top end of the Honeywell line.

Honeywell became allied with Bull, which has specialized in minicomputer development for sale by Bull and Honeywell, when it acquired a 66% interest in the French firm through its acquisition of General Electric Co.'s computer business in 1970. Honeywell reduced ownership in Bull to 47% in 1976, when the French company merged with Compagnie Internationale pour l'Informatique (CII). In 1982, Honeywell sold half its interest in CII-Honeywell Bull to the French government, and the firm was nationalized.

Honeywell said it expects to be the largest customer for Honeywell Bull products, purchasing systems for use internally, for integration within its building and industrial automation systems and for resale through its Federal Systems Division, which was not included in the sale to Bull and NEC. The retention of the Federal Systems Division has been seen as a move to prevent any opposition to U.S. government purchases from a company controlled by foreign ownership. The U.S. government represents the largest sales base for Honeywell products.

Responding to the current U.S. climate for foreign ownership in light of the opposition to Fujitsu Ltd.'s forsaken acquisition of Fairchild Semiconductor Corp., Meyer said the companies have kept the government apprised and consider the venture "a done deal." Although NEC is not allowed to purchase further shares in the venture under the current agreement, Meyer noted that "anything is negotiable."

Reported by staff members Alan Alper, James Connolly and Clinton Wilder.

INSIDE LINES

We don't DB2 the PC. Norris van den Berg, IBM's advanced data base project manager in Santa Teresa, Calif., said last week in Washington, D.C., that IBM plans to put a relational data base product on each of its processors. Asked if that included the IBM Personal Computer, he said yes but that it would not be a version of DB2. "I suspect you don't have enough memory on a PC for DB2," he said, noting that much of DB2's underlying system was designed to make the data base management system work with IBM's MVS/XA operating system. With six million lines of code, MVS/XA will never be confused with a PC operating system.

Dusty museum setting. Most MIS managers think of disaster as fire or flood, but last week, Boston's surprised Museum of Fine Arts staff had to move its computer operations to a Wang hot site when dust from computer-room expansions brought the systems down.

Apple set to phone in. Northern Telecom and Apple are expected this week to jointly announce products that will provide communications among multiple Appletalk local-area networks (LAN) via Northern Telecom's Meridian SL1 private branch exchange system. Macintosh users on any of the connected LANs will be able to exchange files as well as share storage space on Memorybank 485, a 485M-byte storage subsystem designed for Macintoshes and Appleshare, a Northern Telecom spokesman said.

Sounds heady! DEC Senior Vice-President Win Hindle has had a major shift in responsibilities during recent weeks. Hindle, a 25-year DEC veteran, will now split his time between "executive committee issues" and "high-level customer business," according to a DEC spokesman. Hindle's responsibilities for corporate quality, purchasing, information systems, corporate planning and the internal corporate consultant group have been distributed among Jack Smith, senior vice-president; John Sims, vice-president of personnel and administration; and James Osterhoff, vice-president, finance. Hindle currently retains the corporate marketing and public relations functions, but, according to the spokesman, that area is in the process of being restructured while the search for a replacement for departed public relations chief David Price continues.

Pass the token. Sources say Novell has developed a version of its Netware to run over IBM's newly enhanced Token-Ring network. It's worth noting that IBM, which has turned to Novell once before for technical aid, is expected this week to release a new version of its PC Program network software. If IBM has decided to resell Netware with the Token-Ring, 3Com Chairman Robert Metcalfe concedes, "it will hurt us badly reputation-wise."

But will anyone be listening? Issues of American competitiveness, in general, and the new generation of microprocessors, in particular, will be aired at the National Computer Conference in Chicago in June during the keynote address by Robert W. Galvin, chairman of Motorola. Galvin's address is expected to cover his ongoing concern with America's challenge from Japan as well as Motorola's 68000 microprocessor and expected advances in personal computers and their integration with mainframes.

We vote for Rio. Two years ago, the fashionable way to announce computer products was on boats, such as luxury yachts cruising the Hudson River. More recently, introductions were being held in art galleries and museums. Now the popular setting is music. Control Data's introduction of its Cyber 930 departmental system was set in a Greenwich Village jazz club with the theme "930 In Concert." Next week, DG will host "Data General In Concert," a Chicago media event that includes seminars and receptions. However, rather than focus on a product announcement, DG will be proving how it works "in concert" with its customers.

Salty chips. After a two-month delay, Intel's Personal Computer Enhancement Operation has begun shipping its Inboard 386/AT add-in board for the IBM PC AT. A spokeswoman for the company said the hold up was caused by "compatibility issues."

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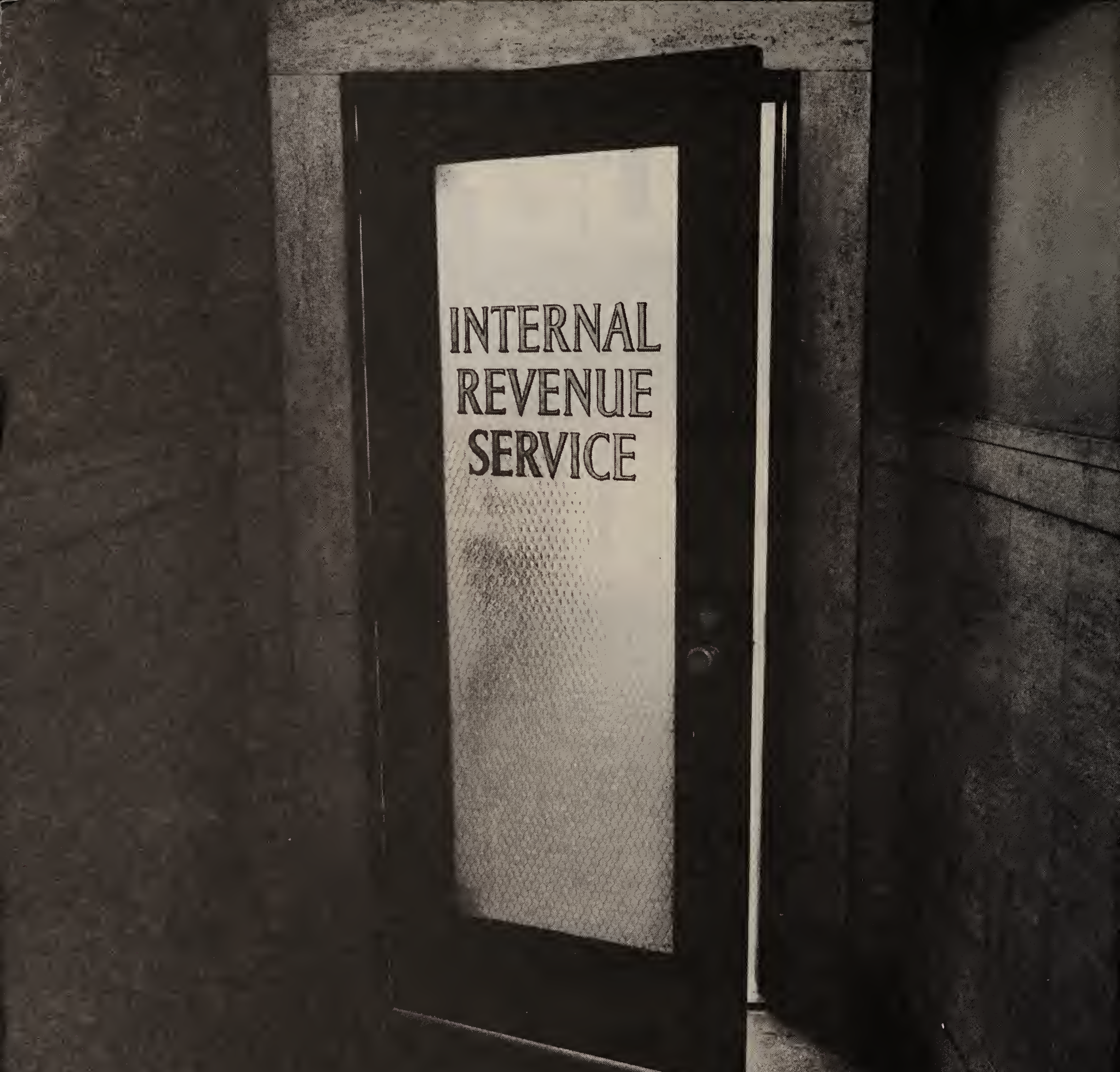

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